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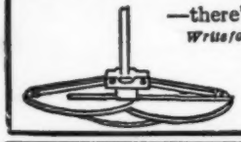

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By the Way—

Now that we have started on the 1918 stage of our journey, let us remember:

That this new year promises to be one of the most momentous in the history of our country, and that every citizen should do his full duty, whether he is in the military or in that vaster army at home which supports the men at the front.

The importance of keeping the wheels of industry turning cannot be overestimated. A patriotic, devoted people will bend every energy to maintain a united front at home, for that wears a cohesive, successful battle-line abroad.

Teamwork is the imperative need of the American people today. The union of states needs the union of effort. Let us all serve our country in faithful accordance with the motto: "One for all and all for one."

A Story with a Point.

The publication, "Your Street Railway Service," of the Bay State Street Railway Co., which is distributed among the company's patrons, recently contained a little story which is of interest to telephone men. It was a story about "The Pup that Became a Dog."

It seems a certain poor man, who had to be economical, became possessed of a little pup which had great possibilities. "This pup," he said, "can live and grow fat on ten cents' worth of meat per day." So the pup was given that much meat.

Months went by and the pup grew into a big dog, as is the habit of most puppies. He was not only big but he was valuable. Then the ten cents' worth of meat was gobbled up in a mouthful and the dog barked in an attempt to persuade his master to give him more.

But the owner, in response to the numerous barks, said: "Ten cents' worth of meat was enough for you when you were a pup, and ten cents' worth is now."

Time went on and the cost of meat doubled. But the owner continued to give his dog ten cents' worth and no more. The dog grew thin and weak on this kind of treatment and, after a while, he simply dropped in a corner and died.

"Gosh!" exclaimed the late owner, "I did not think a dog getting ten cents' worth of meat would starve to death."

The railway company drew two morals from this tale. The first was: "What nourishes a pup may starve a dog." The second moral was: "Pup fares will not nourish a street railway dog."

We might add another moral to this tale, that "a pup telephone rate will not keep a real telephone dog alive long."

A telephone pup of 15 years ago is now a big telephone dog. The dollar which furnished him with his meat when a pup no longer buys the same amount of sustenance. It is considerably less. Moreover the pup is now a full-fledged telephone dog and needs correspondingly more food to keep him alive and healthy and of corresponding value to his owner.

Reducing the Waste.

"There are two questions that telephone executives are going to concern themselves with this coming year," stated a prominent telephone man recently. He referred to taxes and the increasing number of reports required of telephone companies by state and federal bodies.

Telephone companies are interested in taxes, as they are growing heavier each year. Money is raised by taxation and in many states it is wastefully spent. That is the one great reason why telephone companies are interested—and why their subscribers also should be interested.

Standardization of reports required by state and federal bodies would effect a great saving of time and energy. It is especially desirable now that so many telephone companies are short of help.

Reports are required from so many different bodies that their compilation has become very burdensome. One method of reducing the work on these reports would be for the state associations to develop a report form which would contain all the information required by the various bodies. It could then be submitted to those in charge of the report-gathering divisions with explanations and arguments for its adoption.

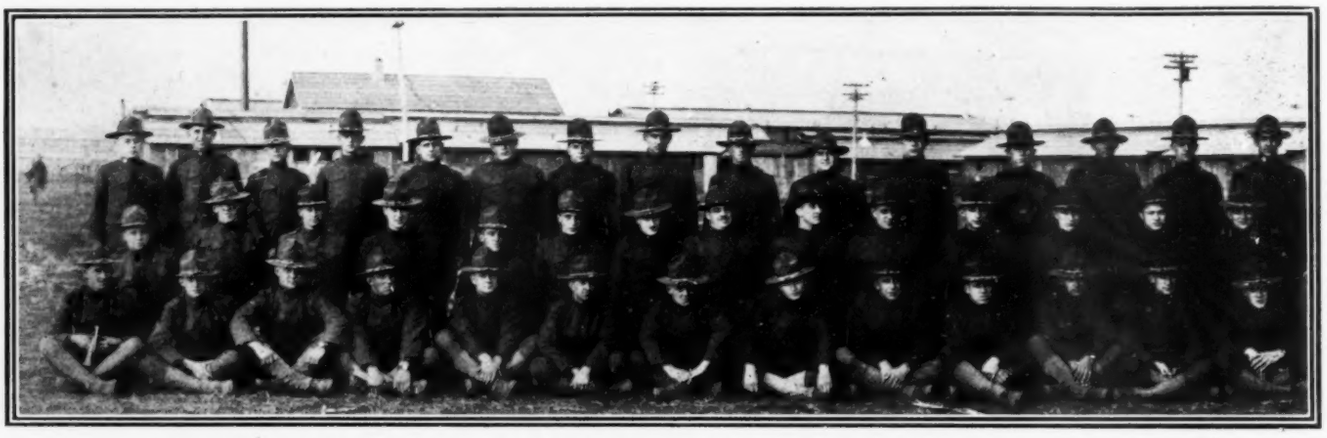
It might be advisable to design more than one form, depending upon state conditions, but certainly something can be worked out to reduce the enormous amount of work now required. There should be co-operation and then co-ordination.

Signal Battalion at Camp Custer

Organization of 310th Signal Battalion at Battle Creek, Mich., Consisting of a Radio, Wire and Outpost Company—Men in High Spirits and Rounding into "Service Condition" to Carry Out Uncle Sam's Orders

Camp Custer, the present home of the 85th division of the National Army, is situated about five miles west of Battle Creek, Mich.—the food city of America. Anyone who has passed through this district knows that the camp is in the heart of a busy, thriving section of the state—just near enough to "dynamic Detroit" to absorb some of its characteristics and just distant enough from Chicago not to be lured by the sights of and to participate in the benefits of that metropolis.

On October 5 the men making up the 85th began to arrive at the camp. Needless to say, those were busy days, for the forming of a national army was something new and a task heretofore not undertaken. Throughout those early days enough men were sifted out from the drafted men to form a signal battalion.



A Section of Company C of the 310th Field Signal Battalion Stationed at Camp Custer, Battle Creek, Mich.

The Duty of Company C Is to Supply Information From the First Line Trenches to the Commanding Officers.

Company C, the Outpost or Field Telephone Company, With Its Enlarged Personnel Is the Largest Company in the National Army.

Company A, the Radio Company at Camp Custer, Battle Creek, Mich., Employs Pack Sets for Communication Purposes.

one of the essential units of an army division.

At that time a signal battalion consisted of three companies of 75 men each. The forming of the battalion was a simple matter, but obtaining signal corps officers to command it was somewhat of a difficulty. Due to the lack of signal corps officers, officers from the infantry were assigned to the battalion, Lieut.-Col. George E. Stewart being in command of this signal corps unit.

During that period the work consisted mostly of infantry drill—the first and essential step towards discipline and the making of a good soldier. Gradually signal corps officers arrived at the cantonment from the officers trainings camps and most of the infantry officers were relieved from duty with the battalion.

About this time came the order that the outpost company, C, should be enlarged. The best signal corps material in the three companies of drafted men then in camp was combined with the reserve outpost men to make up C company, and thus it was well started towards its full enlisted strength. The enlisted reserve men—radio, wire and outpost—recruited mostly from Illinois and its surrounding states—having been ordered to the 310th Field Signal Battalion at Camp Custer, completed the organization. These men, for the most part, were technical men—telephone men, telegraph operators and electricians, many of them coming from the Independent telephone field.

Major Edwin O. Baker.

The battalion is now well organized, work fully under way, and the spirit running high. It is so high that everyone feels certain that he could subdue the highest waves of the Atlantic and make a frantic effort to get "over there."

As previously stated, the battalion proper is composed of three companies and the headquarters and supply section The headquarters and supply section is engaged in the administrative duties of the battalion.

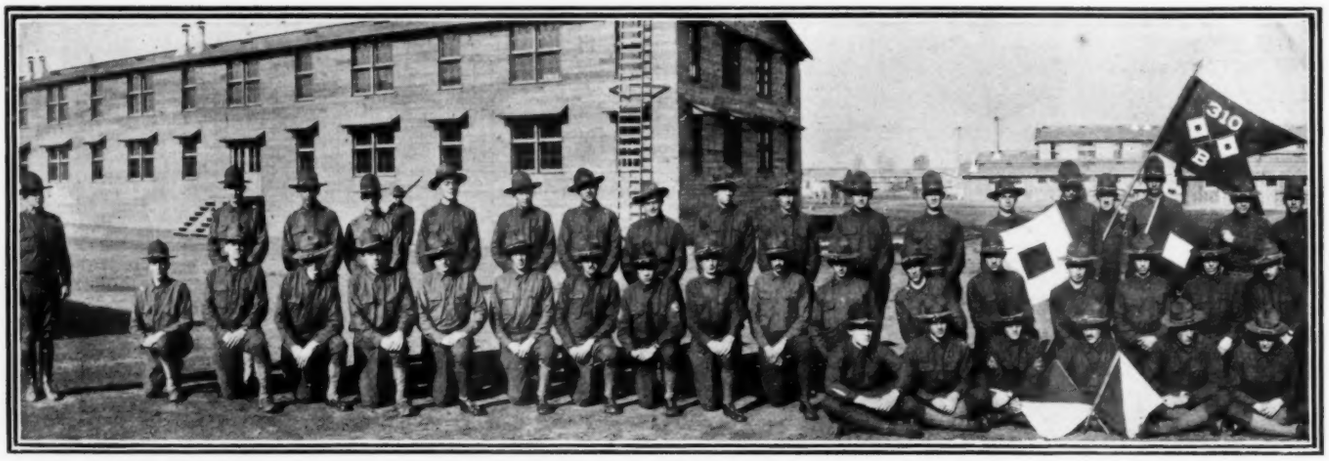
Company A, being the radio company, employs pack sets for communication purposes.

Company B is the wire company. Its duties are to lay lines of communication between the various units of the army on the front and to keep them in constant touch with each other.

Company C, the outpost or telephone company, with its enlarged personnel, is the largest company in the army. Its duty is to supply information from the first line trenches to the commanders.

Up to the present time the universal opinion among the men is that soldier life is not a great hardship, but on the other hand that it is a privilege and an

The Radio Company Supplies Communication to the Cavalry and Other Units Where Wire Lines Are Not Practicable.



Wire Company B of the 310th Field Signal Battalion at Camp Custer, the Home of the 85th Division of the National Army.

enjoyment. The principal duty of all is to keep up spirits and good humor and to live as comrades, all standing on the same level and fighting for the one cause.

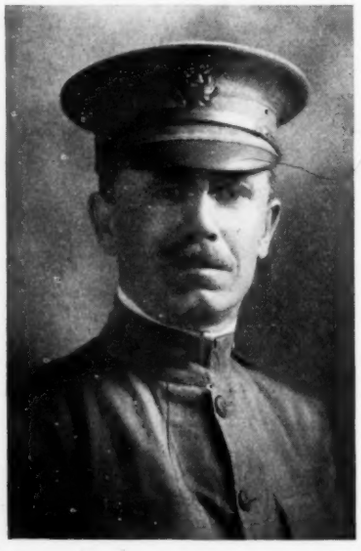
The greatest factor in maintaining these qualities is the Y. M. C. A. Every evening the "Y" huts are crowded—music, games, shows, etc., being enjoyed. Here also the soldier finds stationery and writing material, and this is where most of the soldiers' letters are written.

The 310th Field Signal Battalion is fortunate in being situated near the main Y. M. C. A. auditorium, where shows or amusements of some sort are provided every evening.

A spirit of friendly rivalry exists among the companies of the battalion and competitive athletic contests, drills, etc., are indulged in. Heliograph work and visual signaling also take up a great part of the time. The companies have Victrolas and pianos, and Company C boasts a "None Such" orchestra and quartette that would be hard to beat.

November 29 Company C staged a vaudeville show to which the battalion officers were invited, and on December 20 this company staged a real, old-time minstrel show in the "Y" auditorium. Ten cents admission was charged and a packed house witnessed the performance—more money for the mess fund.

Company A is the proud possessor of



Capt. Frank A. Marvin.

Capt. Keene Richards.

The Duty of the Wire Company Is to Lay and Maintain Communication Lines Between the Various Army Units on the Front.

one of the best lightweight boxers in the camp, Freddie Ferrell. He has shown to advantage in several recent bouts and critics pronounce him to be a comer.

Companies A and B have each given a ball and Company C is to give one in the near future. These social functions are thoroughly enjoyed and serve to bring the men into closer contact with each other as well as providing pleasure and amusement.

The first skating rink to be built at Camp Custer was constructed by the signal battalion. One hundred fifty pairs of skates have been secured and the rink is open to the men of the battalion, a fee of 5 cents being charged for the upkeep and repair of the skates.

The battalion has a wireless station actively employed and Company C has twenty-eight carrier pigeons that are being trained by carrier pigeon experts.

Company C boasts a full-fledged American eagle, which was sent to the company by an admirer. "Old Abe, the Second," is his name, and that he is an able mascot is agreed by all who have seen him.

Christmas holiday leaves were so arranged that the entire organization had three days with the home folks, going 25 per cent at a time beginning December 22. A part of the command was present at camp over Christmas, but the companies arranged for real Christmas celebrations. Christmas trees and stunts of all sorts, including a Christmas dinner, were uncorked.

Battle Creek is quite a Mecca for social activities and many enjoyable affairs have been partaken of by the various organizations. Not to be outdone along this line, the officers of the signal battalion are giving a ball on the evening of January 11. It is to be held at the Post Tavern and promises to be one of the leading social functions of the season.

The commissioned personnel of the battalion, with their former occupations, is as follows:

Major Edwin O. Baker, formerly of the Wabash Valley Telephone Co., Paris, Ill.; Capt. Frank A. Marvin, of the Western Union Telegraph Co., Watertown, S. D.; Capt. Keene Richards, formerly division superintendent, Public Service Co. of Northern Illinois, Chicago.

Lieut. R. H. McWhorter, Pacific Telephone & Telegraph Co., Raymond, Wash.; Lieut. James A. Parnell, from the department signal office, Chicago; Lieut. R. L. Taylor, Louisville Home Telephone Co., Louisville, Ky.; Lieut. James M. Schoonover, Citizens' Independent Telephone Co., Terre Haute, Ind.; Lieut. Guy H. Morehouse and Lieut. Paul R. Williams, Western Union Telegraph Co., Denver, Col. Lieut. Thomas P. Camelon, of Detroit, Mich, battalion medical officer, is in charge of the sanitary detachment.

These officers, with seven infantry officers attached for duty, complete the commissioned personnel. Another signal corps captain and also a lieutenant are expected to arrive soon. With their arrival, the battalion will be well supplied with officers.

The 310th Field Signal Battalion is rapidly rounding out into "service condition" and will soon be prepared to carry out the orders of Uncle Sam.

Central Home Western District Meeting at Paducah, Ky.

Some seventy or more of the employes of the Central Home Telephone & Telegraph Co. of the western district of Kentucky were present at the meeting held at Paducah, December 8. Bad weather conditions, a railroad wreck which held up traffic and other unfavorable conditions, delayed a considerable number of the company folk who were to be on hand, but the program was carried out in a most interesting way.

During the afternoon those who arrived were entertained as well as the stormy weather permitted, the chief operators having a conference of three hours in the afternoon. An excellent banquet was served at the Palmer House at 6 o'clock, after which the tables were cleared and the business session held in the dining-room.

One of the principal features of the meeting was the demonstration of long distance operating, with Miss Dorris Duncan, chief operator at Paducah, in charge. Numerous operators from among those present were called to the desk to take their turn at the line.

A most interesting paper on "Service" was presented by Miss Alzadah Stewart, information operator at Paducah.

B. Y. Chambers, manager of the western district, was master of ceremonies, and present and making talks were Minor Corman, general superintendent of the system; W. M. Paine, assistant superintendent; E. M. Veatch, manager at Paducah, and S. M. Heller, general manager of the Central Home.

Some of Those Present at the District Meeting of the Central Home Telephone & Telegraph Co. Recently Held at Paducah, Ky.

Workmen's Compensation Act

Some Experiences in Administration of Indiana Workmen's Compensation Act—Principle Upon Which Workmen's Compensation Acts Are Founded—Paper Presented at Indiana Independent Telephone Convention

By Judge Samuel R. Artman

The subject does not contemplate a discussion of the economical and legal principles upon which workmen's compensation acts are founded. However, a mere statement of the principle may not be inappropriate as an introduction to a narration of a few of the experiences in the administration of the Indiana act, and this leads me to say that the present address is intended to be nothing more than a narration.

A close observation of industrial accidents throughout the world led to the conclusion that a very large percentage, in fact practically all, of the injuries of industrial workmen, are as inherently incidental to the employment as is the breaking and wearing out of machinery. The cost of replacing worn out machinery and of making repairs of all breaks and defects therein, has always been regarded as a natural cost of production, and, therefore, a legitimate expense of the industry.

From the demonstrated fact that most all of the injuries to workmen are as naturally inherent in the work as the breaking and wearing out of machinery, the conclusion inevitably follows that the cost of restoring the injured workman to his position and in making good the diminution of his working ability, on account of injury, is logically just as much a legitimate expense of the industry as the supply and repair of machinery. It is upon this principle that workmen's compensation acts are founded.

The theory is that, as the injuries are inherently incidental to the industry, the expense of restoring the injured, or making good the diminution of his working capacity should, from both the economical and legal viewpoint, be charged to the industry, paid in the first instance by the employer, added to the cost of the production, and collected back by the employer from the consumer.

Volume of Industrial Accidents.

The general assembly of Indiana, in contemplating the enactment of a workmen's compensation law, had but very little definite and reliable information as to the volume of industrial accidents within the state. It was compelled to justify the enactment of the statute upon the experiences in Germany and England and on very limited experiences of compensation states of the union.

In section 67 of the Indiana workmen's compensation act provision was made for a report to the industrial board of all accidental injuries requiring the absence of the workman for more than one day.

In the preliminary preparation for the taking effect of the act and in providing the forms for its administration, there was much speculation as to the number of industrial accidents that the board would have to deal with per year.

The speaker remembers a conference with a number of representatives of insurance companies who were proposing to write workmen's compensation insurance, at which one of the insurance representatives asked the speaker as to his judgment as to the number of industrial accidents that the board would have to deal with in the first year. After some hesitation a guess of 5,000 was made. The insurance man replied that it would be 15,000. At the conclusion of the first year, August 31, 1916, 36,176 of such accidents had been reported; for the second year 42,453—a total for the two years of 78,629, or an average per year of 39,314. There was an increase of practically 7,000 reports in the second year. This may be accounted for upon three grounds.

A large percentage of accidents were not reported during the year 1916 for the reason that many employers did not report accidents through ignorance of the provision. A larger number of employers were informed as to the requirements and made more complete reports in the second year. Secondly, there was a vast increase in the industrial activity in the second year.

Especially since it became apparent that the United States would become a participant in the world war and it took upon itself the recruiting of an army and navy, a great many skilled and experienced workmen have withdrawn from industrial life and their places have been filled by inexperienced and unskilled workmen. A larger percentage of accidents always obtains among inexperienced and unskilled workmen than among men of skill and experience.

When we consider the fact that Indiana has 3 per cent. of the population of the United States, and, assuming that the accidents in Indiana would be a just basis for forecasting the number of industrial injuries in the United States in a single year, we find that the aggregate would be 1,300,466. The accidents in Indiana show an average in excess of 107 per day or four and one-half per hour, and approximately one for every 13½ minutes. The total number of dismemberments in the first year were 760, the second year 869, or an average per year of 814.

Again considering the dismemberments in Indiana as 3 per cent. of the dismemberments in the nation, we have an annual dismemberment in the industries in the United States of 27,133. In the first year there were 269 fatal accidents reported; in the second year 305, or an average of 287, and again on the 3 per cent. basis of population it would equal 9,566 annually in the United States. It thus becomes apparent that the casualty accidents and deaths in the industries of Indiana in a single year exceed the casualty injuries and deaths of the United States in both army and navy in the Spanish-American war.

Accident Prevention.

The legislature declared the first and major purpose of the Indiana workmen's compensation act to be the promotion of the prevention of industrial accidents. However generous its provisions may be as to compensation rate and the period of compensation payment, no compensation law ever has been or ever will be a complete and adequate substitute for the death, dismemberment or injury of an industrial workman.

From purely the humanitarian standpoint, experience demonstrates the fact that the better policy is to save workmen from injury, dismemberment and death than to attempt to compensate therefor.

Economic Phase of Prevention.

Two years' experience has made it quite clear that employers have not given careful consideration to the economical phases of accident prevention.

Experience also demonstrates the fact that employers who insure their compensation liability are the most derelict in accident prevention. Having insured their compensation liability, they apparently lose sight of the economical phase of accident prevention. Experience also discloses the fact that there is some reason for this.

Insurance rates are fixed largely by the classification of industries. So long as rates are established solely upon this basis, the employer who has taken every precaution to prevent accidents, pays the same insurance rate as the employer in the same industry who wholly ignores and disregards all precautions for accident prevention.

This leads to the conclusion that the

system of determining workmen's compensation insurance rates is defective and that there must be some system of individual rating of employers, and that rates must not be established solely and alone by the classification of industries.

The employer who carries his own risk, according to the two years' experience, sees more clearly the economical relation between safety and his compensation expense. As he pays direct the liabilities incurred under the compensation law, he seems to perceive more keenly the advantage of safety precautions and the prevention of accidents than does the employer who pays his compensation premium and leaves the adjustment and payment of liabilities under the compensation act to an insurance company.

Disability Experience.

Of the 78,629 injuries reported in the two years 39.2 per cent. or 30,822 had a disability of eight days or more. In other words, on a seven-day waiting period 30,822 workmen were entitled to compensation.

Of the total number of injured 20.7 per cent. had a disability of 15 days or more, or 16,276 were entitled to draw compensation upon a 14-day waiting period.

Compensation Experience Two Years.

As shown by the records of the industrial board, the actual payment of compensation to injured workmen and their dependents during the first year was $388,433.

Compensation was awarded by agreement and upon hearings before the industrial board for death, dismemberment and permanent partial impairment, in which the period of compensation could be definitely fixed, in the first year in the sum of $356,000, making a total of $744,443.

In this connection it should be remembered that these figures do not include the temporary running cases of mere temporary total or partial disability to workmen in which payments continued beyond August 31, 1916.

It can not be stated with absolute exactness, but a conservative estimate from the information in possession of the board is to the effect that injured employes received, during the first year in hospital and medical benefits, $150,000, or an aggregate benefit of $894,433.

Increase for the Second Year.

The records show a decided increase for the second year. There was paid out on closed cases during each of the last eleven months of the second year the following amounts: October, 1916, $27,008; November, 1916, $37,007; December, 1916, $33,165; January, 1917, $39,166; February, 1917, $42,728; March, 1917, $59,747; April, 1917, $42,713; May, 1917, $49,831; June, 1917, $62,444; July, 1917, $49,463, and August, 1917, $73,397, making a total paid out on closed cases in 11 months of $517,670.

The amount of fixed and definite liability for the second year, not included in closed cases, will approximate $400,000, and it is estimated that the medical and hospital benefits for the second year will aggregate $250,000, or a total for the year of $1,167,670.

Automatic Operation of the Law.

The Indiana act differs widely from many of the other compensation laws in that it provides a system of automatic administration. By this I mean that it provides that the employer and the employe in the first instance have the right to make a settlement of the compensation liability according to the provision of the act without interference by the industrial board. Two conditions must attend such a settlement. The settlement must be made according to the provisions of the act and must be filed with the industrial board for approval, the board having the right to approve only when the agreement conforms to the provisions of the act.

In many of the other states the settlements are made directly by the board or a representative. As a result of this system, compensation settlements in such states are becoming practically as long delayed as damage suit settlements in the courts, and in the next place it requires a vastly increased force in the employment of the state to handle the compensation business.

The experience in Indiana for two years shows that practically 98 per cent. of the compensation claims have been settled under the automatic provision of the statute. In other words, practically only 2 per cent. of the compensation claims have been contested.

As a result of this system the industrial board of Indiana has at all times been and is now, as nearly up with its work as it is practicable to be. The hearings of some claims have to be continued because of the absence of witnesses, sickness of parties, or other unavoidable reasons. Notwithstanding these conditions the industrial board is practically even with its work.

Weekly Compensation Rate.

The average weekly wage of the workmen whose injuries were reported during the first year was $13.02. The average weekly wage of those workmen whose disability carried them into the compensation period was $13.92, making an average weekly compensation rate during the first year of $7.66.

The average weekly wage of the employes whose injuries were reported during the second year was $16.22. The average weekly wage of those workmen whose disability carried them into the compensation period was $15.20, making the average weekly compensation rate for the second year $8.37.

It thus appears that there was an increase of $1.28 in the average weekly wages of those injured employes who went into the compensation period during the second year over the average weekly wage of the injured employes who went into the compensation period in the first year, or an increase of 71 cents in the average weekly compensation rate of the second year over that of the first.

It should be said to the credit of the vast army of industrial workmen in Indiana, that two years' experience has brought to light very few pronounced and unquestioned cases of malingering. There have been such cases, of course, and some wholly unfounded claims have been made for compensation, but, as compared to the vast number of injured employes, the number of such claims is practically negligible. This situation is a monument to the integrity of Indiana workmen.

Medical Expense.

From every hand the complaint is made that the medical expense of the injuries, under the Indiana workmen's compensation act, is too great, which seems to be the experience under practically every workmen's compensation act in the United States. Many suggestions as to changes in the law, in reference to medical expenses have been made. It is the view of the board that a change in the law is not required or advisable.

The board is inclined to the view that most of the excess expense occurs in cases where the employer has insured his compensation liability. In such cases the unnecessary expense largely arises from two sources: First, too little attention on the part of the employer, and second, the assumption of too much control on the part of the insurance company.

There is practically no complaint as to medical expense from employers who carry their own risks without insurance. In such cases the employer gives the matter of medical service his personal attention, and in such instances the injured employe is neither under nor over-treated.

Insurance carriers, for some reason or other, seem to be impressed with the idea that they have superskill in providing medical and hospital services. Results do not justify the assumption. Experience discloses that, by the assumption of absolute control of this phase of compensation liability, the injured is frequently under-treated. In many instances, as a result of it, the compensation period is prolonged.

On the other hand, where, as between the employer and the insurance carrier, the insurance carrier has reserved the right to control medical and hospital service, and has not made adequate pro-

vision for it, there has been over-treatment and an unnecessary expense.

Section 26 of the compensation act provides that "the pecuniary liability of the employer for medical, surgical and hospital service herein required shall be limited to such charges as prevail in the same community for similar treatment of injured persons of a like standard of living when such treatment is paid for by the injured person."

This clearly means that the injured person should be treated from his standpoint and that the same charges shall be made therefor as would be made if he were paying the expense himself. A doctor who will so treat and so charge can be found in every community, and the employer is best prepared to provide such a doctor.

To repeat, it is the view of the industrial board that most of the unjustifiable expense of medical and hospital services arises from the assumption of that control by the insurance company, when the matter should be left to and handled directly by the employer.

As accurately as the matter can be determined, 45,000 employers were under the act during the first year and 50,000 the second year. During the first year 3,125 employers exempted themselves from the act; during the second year, 4,000. The increased number of exemptions may be accounted for almost entirely by the increase in insurance rates.

The exemptions are largely by small retail merchants and employers having a very limited number of employes and a small pay roll, who, because of a two or three hundred per cent. increase in the minimum rate by the insurance companies, exempted themselves from the act.

Attempting to justify themselves by the vastly increased industrial activity, on account of the entrance of the United States into the world war, the industrial board has been besieged by a great many employers with requests to ignore the provisions of the inspection laws, the child and woman labor laws.

The board has steadfastly adhered to the position that it is not a legislature and that it has no power to set aside the positive provisions of legislative enactments; that the duty of enforcing these statutes is imposed upon the board and that it must honestly, fearlessly and impartially discharge that duty. Upon the entrance of our country into the war, an attempt was set up throughout the states, for a temporary repeal or a suspension of the enforcement of such laws.

The council of national defense, in its bulletin, entitled, the "National Service Handbook," deplores such efforts and insists upon the strict enforcement of such statutes. In justification of its position the national council of defense says:

"If this were certain to be a short war, a temporary speeding up of labor might be permissible, but English experience since the beginning of the war has clearly demonstrated that although the labor conventions may be disregarded for an extended period, the laws of physiology can not be repealed. An extension in the number of hours beyond a certain point, instead of increasing the output, is almost certain to reduce it.

"The 'stale' worker will produce less in quantity and quality than the one who remains fit; there will be an increase in the sick list, more broken time, and a disorganization of the factory. A few weeks' overtime may mean more output, but after that it will mean a steady lessening of the capacity of each individual worker."

In conclusion, I may say, that the experience of two years abundantly justifies the enactment, the continuance and faithful enforcement of "the Indiana workmen's compensation act."

From Old Kentucky.

The following letter from B. D. Williams, president of the Auburn (Ky.) Home Telephone Co., is one of the best New Years' greetings we ever received, for the reason that it shows a TELEPHONY subscriber is following the advice of this journal and is prospering.

Here's hoping that the Auburn Home continues to succeed, and there is no doubt it will so long as it is guided by the enterprising staff of men who hold the reins today.

"Telephony Publishing Co.
Chicago, Ill.,
Gentlemen:

At the annual meeting of stockholders, held recently, the following were all re-elected as directors: B. D. Williams, A. McCarley, T. D. Hamblin, W. H. McKenzie, and P. B. Elliott.

The following officers were re-elected: B. D. Williams, president; A. McCarley, vice-president; W. H. McKenzie, secretary and treasurer.

Our usual dividend of 10 per cent was declared and 10 per cent was set aside for maintenance.

We have decided to 'go over the top' by raising our cheap rural subscribers. Of course we will have some kickers, but we do not have any fear of losing any subscribers. In fact, we raised some of these lines on October 1 and did not have a single person pull off.

We are having more calls at the present time for rural telephones than we have ever had at this time of the year. In fact, most all of our cables are filled to their capacity, and we have very little more space for extensions.

Wishing TELEPHONY a prosperous New Year and especially Mr. Kelsey, we are,

Very respectfully,
AUBURN HOME TELEPHONE CO.,
(Signed) B. D. Williams, President."

Publication of Technical Data on Inductive Interference.

The Joint Committee on Inductive Interference, organized in December, 1912, by the California Railroad Commission and authorized to conduct an investigation of the problem of inductive interference to communication circuits by parallel power circuits, has completed its work, after continuously investigating this subject for over five years at a cost of over $100,000.

Some of the general conclusions have been published at different times during the progress of the investigation, but practically none of the technical data gathered have thus far been made generally available.

From time to time during the course of this work, technical reports have been prepared which give the data obtained from the tests and the results and conclusions derived from both the tests and from theoretical studies. Thirty of these technical reports have been selected as being of such general interest and applicability to warrant publication.

In addition to the technical reports the publication will contain final recommendations for rules for the prevention and mitigation of inductive interference and valuable historical matter concerning the investigation with general and technical discussions on the subject.

The book will have a complete index and contain approximately 1,000 pages with over 400 drawings and 30 photographs.

The publication is contingent upon obtaining, in advance, a sufficient number of subscriptions to cover the actual cost of printing and binding at not to exceed, and probably considerably less, than $10 per set (one or two volumes).

Those who are interested in this problem will find these reports of considerable value. They are invited to enter their subscription with the California Railroad Commission, attention Richard Sachse, chief engineer, 833 Market street, San Francisco, Cal.

As the number of copies printed will be somewhat limited, only those subscribing in advance can be assured of receiving copies in the event the number of subscriptions justifies the publication of the book.

Those who place subscriptions will be advised as soon as possible whether the publication will be undertaken and the approximate cost per set.

Making of Strong Indiana Company

How the Home Telephone and Telegraph Co. Made Good in Fort Wayne and Contiguous Territory in the Face of Vigorous Competition—Twenty-First Year of Operation, Recently Closed, the Most Successful in Its History

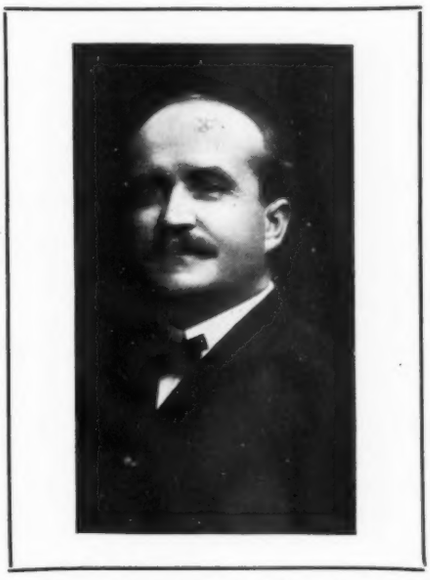
By L M Peterson

The Home Telephone & Telegraph Co., of Fort Wayne, Ind., has now reached its majority, the directors having recently closed the company's books for the 21st fiscal year. In its infancy there were but a few awesome calls a day from the ungainly telephone boxes but now at the close of its 21st year of operation, some 150,000 messages are daily sent over its wires—all of which indicates the healthy growth the company has experienced.

The Home company now serves 13,000 patrons in the city of Fort Wayne, an average of one telephone for every eight persons. In addition it operates some 2,000 telephones in the territory contiguous to Fort Wayne, making a total of 15,000 in the entire system.

The year just completed in the life of the Home company is said to be the most successful in the history of the company. It has witnessed the largest scope of planning in the face of the most stringent economic conditions. Although considerably more money was needed to meet the plans of 1916-17, owing to the high price of metals and other materials involved in telephone construction work, every project of the company worked out as had been planned.

The Fort Wayne Home company was founded in 1896 by an association of 100 business men of Fort Wayne with a capital of $100,000. At that time the



W. L. Moellering, President-General Manager.

Central Union Telephone Co. was operating an exchange in Fort Wayne with 527 telephones. The rates were $4 per month for business telephones and $3 for residence telephones, with an extra charge of $1 per month if the telephone was located more than a mile from the central office.

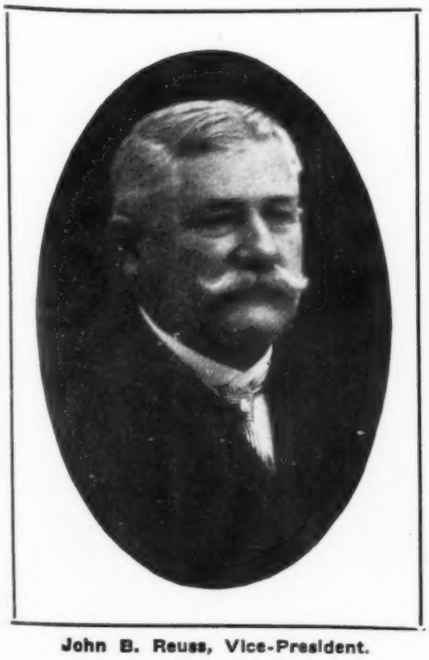
The Home company commenced operations with a rate of $3 per month for business telephones and $2 for residence telephones and in two months' time it had 800 telephones in operation in Fort Wayne.

Two years later the company bonded itself in the sum of $250,000 but as the business grew, the bonded debt was paid off. When the Home company closed its 21st fiscal year a short time ago, announcement was made that it would take in all bonds at a premium. The bonded indebtedness of the company has now been entirely wiped out.

The central offices of the company were first located on the second and third floors of the Gas Office building on Court street, in which quarters business was conducted for nearly ten years. G. W. Beers was the first president; Theodore Thorward, manager; and John W. Sale, secretary. The first board of directors included S. M. Foster, John W. Sale, W. J. Vesey, Charles McCulloch, John Evans, Louis Fox, Capt. C. Hettler and G. W. Beers.

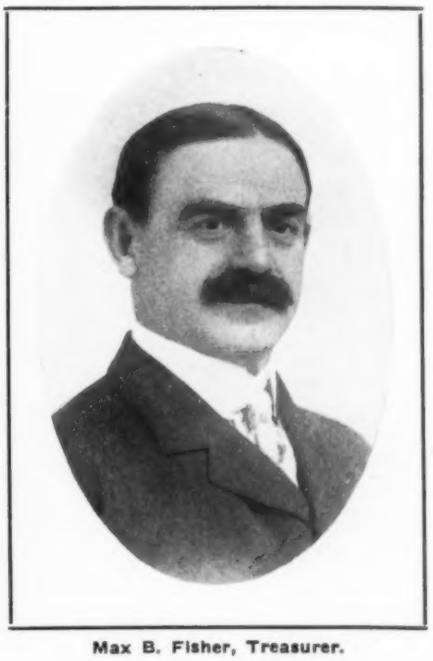
In 1898 William L. Moellering took charge of the company's affairs as general manager and secretary. At that time the board of directors consisted of Charles Bash, W. A. Bohn, G. Max Hofmann, Cass Hunter, C. Hettler, Isidor Lehman, William L. Moellering and John B. Reuss.

Frank E. Bohn first became associated with the Home company in 1907 and in three years was promoted to the position



John B. Reuss, Vice-President.

Frank E. Bohn, Assistant General Manager.



Max B. Fisher, Treasurer.

O. Marahrens, Auditor; Wm. Neeb, Cashier; Fred Tellman, Accountant; R. B. Gallup, Head of Appraisal Department.

F. X. Staub, Chief Engineer.

of assistant general manager. Prior to entering the telephone field and after graduating from Williams College, Williamstown, Mass., and Purdue University, Lafayette, Ind., Mr. Bohn was for some time associated with the Perfection Biscuit Co., of Fort Wayne, attaining the position of sales and office manager.

In 1915 Mr. Moellering was elevated to the presidency of the company, through the resignation of Mr. Bash, and Mr. Bohn was made secretary. Since that time, these two men have together directed the company's management and it is greatly due to their untiring zeal and careful planning that the company experienced such a rapid growth in the succeeding years, in the face of vigorous Bell competition.

The present officials of the company are: President, William L. Moellering; vice-president, John B. Reuss; secretary,

J. F. Jackson, Head of Collections.

H. F. Kaade, Manager of Contract Department; Martin Umbach, Traffic Manager; George Wagner, Superintendent of Construction.

Frank E. Bohn; treasurer, Max B. Fisher. In addition to the officers named, the board of directors includes August E. C. Becker, W. A. Bohn, Henry R. Freeman, G. Max Hoffman and Isidor Lehman.

In 1906 the Home company purchased The National Telephone & Telegraph System. By this transaction the company acquired more than 1,000 miles of toll lines in Michigan, Ohio and Indiana, in addition to exchanges in Kendallville, Auburn, Sturgis, Mich., and a small town in Ohio. The exchanges outside of the state were soon disposed of, however.

A switchboard was installed in New Haven in 1907, serving 28 subscribers. Since then that exchange has experienced a rapid growth, for it now serves 400 patrons.

Mrs. Gertrude Hagemeister, Chief Operator.

Under Mr. Moellering's management of the Fort Wayne company began the rural telephone extension in that territory. He waged a persistent campaign for the installation of farm telephones, holding meetings in the schoolhouses and talking with the farmers in the fields. He built a rural line nine miles out into the country, believing that the farmers would soon see the value of the telephone—and they did. Now there are more than 700 farmer lines radiating from the Fort Wayne central office.

Main Exchange of the Home Telephone & Telegraph Co. in Fort Wayne.

In 1903, realizing that its facilities in its main exchange at Main and Clinton streets would soon be inadequate, the Fort Wayne company established a branch office at the corner of Masterson and Calhoun streets. The branch office has grown in importance until now it serves more than 4,500 patrons.

A large concrete warehouse has been built on North Clinton street in which the company's motor trucks are housed and its supplies kept.

In the mobilization of the resources of the nation, the Fort Wayne company has been called upon to furnish an important part in the movement of troops and supplies. Government business is given preference to other calls over the company's lines.

Twenty years ago there were two long distance operators employed by the Home company while today 20 girls are kept busy caring for out-of-town calls. At present 130 operators are required to handle the local traffic as compared with 15 operators in 1898.

A one-horse wagon was used to transport supplies and linemen about the city

Miss Agnes Smith, Chief Toll Operator.

Miss Effie Beamer, Information Operator.

Miss Margaret Ryan, Directory Department.

Miss Esther Wolf, Head of Operators' School.

in the early days of the Home company. Now eight speedy automobiles and three large motor trucks form an indispensable factor in the construction and maintenance departments.

The company now has over 300,000 feet

Miss Louise Pohlmeyer, Chief of the South Side Branch.

of aerial lines and 95,000 feet of underground cable. Extension of the underground lines is being carried on rapidly.

The Home company's lines are strung across the arms of 10,027 poles. Direct communication is controlled with Huntington, Auburn, Van Wert (Ohio), Monroeville, Columbus City, Ligonier, Kendallville, Sturgis (Mich.), Avilla, Albion, Butler, Waterloo and South Milford, Ind.

The mainstays in the many departments of the intricate life of the Fort Wayne Home Telephone Co. are: George Wagner, superintendent of construction; Martin Umbach, traffic manager; Margaret Ryan, of the directory department; F. X. Staub, chief engineer; J. F. Jackson, head of collections; R. B. Gallup, head of appraisal department; William Neeb, cashier; H. F. Kaade, manager of the contract department; O. Marahrens, auditor, and Fred Tellman, accountant.

The young women largely responsible for the efficient service rendered by the company include Mrs. Gertrude Hagemeister, chief operator; Miss Agnes Smith, chief toll operator; Effie Beamer, information operator; Louise Pohlmeyer, chief of the south side branch, and Miss Esther Wolf, head of the operators' school.

During the week of December 10-16, the Ft. Wayne Home company conducted "open house" and its subscribers were given an opportunity to inspect both of its exchanges and learn some of the intricacies involved in the furnishing of telephone service. Hundreds of subscribers availed themselves of this privilege.

South Side Branch of Fort Wayne Company Serving Over 4,500 Patrons.

Organ of Wisconsin Association Makes Initial Appearance.

"The Telephone," published by the Wisconsin State Telephone Association, made its initial appearance among Wisconsin telephone men with the December, 1917, issue. The state association has long felt the need of some avenue by which it could reach the telephone interests and convey to the men in the industry the aims and purposes of the association as well as to aid in spreading important telephone news.

It is not intended to make the paper a trade journal, and consequently it will aim to carry only news items each month and information of general interest that may be absorbed by the telephone man and prove helpful to him in the conduct of his business.

A. I. E. E. Meeting in Boston, New York and Chicago.

The 336th meeting of the American Institute of Electrical Engineers will be an inter-sectional meeting held in Boston, January 8; New York, January 11, and Chicago, January 14, 1918. The same paper will be presented and discussed at the three places.

The paper to be presented is entitled "Effects of War Conditions on the Cost and Quality of Electric Service" by Lynn S. Goodman and William B. Jackson, and is given under the auspices of the committee on economics of electric service. The paper will be presented at the Boston and New York meetings by Mr. Goodman and at the Chicago meeting by Mr. Jackson. Non-members of the institute who are interested in this subject are cordially invited to attend and take part in the meeting.

United Home of Muskegon, Mich., Reports Prosperous Year.

Thos. Bromley, Jr., general manager of the United Home Telephone Co., of Muskegon, Mich., reports that his company has prospered to such an extent this year that the board of directors has authorized a dividend of 10 per cent of their salaries for 1917 paid to employes of five years' service and over; 8 per cent to those in the company's employ for four years and 5 per cent to those of one to three years' service.

Out of 121 employes on the company's pay roll, 54 will participate in this dividend.

The directors also authorized the payment of a 3 per cent semi-annual dividend on the preferred and common stock issued.

The company has added $29,998 to its assets, paid all interest and reconstruction items and had but $938 outstanding rentals December 1. Its reserves were $73,371 on November 30, 1916, and $103,883 November 30, 1917.

Convention of South Dakota Independents Postponed.

On account of world conditions and on the advice of many friends and supporters of the South Dakota Independent Telephone Association, the annual meeting scheduled to be held January 30 and 31, 1918, at Watertown, S. D., has been postponed until further notice, by action of the executive committee.

Secretary A. S. Hall, of the association, states that this action was taken after due consideration and solely because of the feeling that at this time nothing should interfere with the carrying forward of the greatest undertaking that humanity has ever faced—keeping the world safe for democracy.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

852. Why is it necessary that other considerations aside from mechanical operation be taken into account when designing telephone switchboard circuits? Give a definition of telephone "traffic" that will serve to cover the subject as it is generally understood.

853. What is the value of telephone traffic data to the designing telephone engineer? How do traffic conditions affect the amount and distribution of telephone switchboard equipment?

854. Have terms been assigned to the various elements of traffic data?

855. What is the commonly accepted meaning of the term "originating calls" as applied to the telephone plant division?

856. What is the distinction between the terms "originating calls" and "effective calls"?

857. What is meant by "busy hour calls"?

858. Define the term "operator's load." Why is there a difference between the number of calls handled by the average operator during one hour and the number handled during the busiest hour?

859. What is meant by "length of conversation"?

860. What is meant by "trunk time"? What is the difference between "trunk time" and "length of conversation"?

861. What is meant by "subscriber answering time"? How is it possible, in many cases, to shorten the "subscriber's answering time"?

862. What is meant by "operator's answering time"? Is this element in the time value of the average call found in automatic systems?

863. Give an illustration of abnormal traffic conditions. Are such conditions as important in very large systems as they are in small systems?

864. What is meant by the mathematical law of probability? How is this made use of in the study of telephone traffic?

865. Give a simple illustration of the mathematical law of probability.

866. Give a simple illustration of the application of traffic data to the equipment for a small office. Why must an allowance be made for a "factor of safety" in such cases?

CHAPTER XXVIII. Nature of Telephone Traffic (Continued).

867. *Trunk time.*—The condition which has been roughly outlined, brings out clearly the first important traffic condition that must be noted in designing central office equipment. The "trunk time" is the elapsed time that must be devoted to serving the average connection. In other words, the average elapsed time during which a cord circuit is not available for handling calls owing to its engagement on other calls, is the trunk time for the cord circuit.

It is obvious that this period includes the time devoted to actual conversation, the subscriber's answering time, and the time required by the operator to remove the connection upon the completion of the conversation. In mechanical switching systems, practically all of which embody an automatic disconnect feature so that the connecting switches are released when the subscribers replace their receivers on the hook, the trunk time for the average connection is invariably less than the trunk time for the average connection handled by manual equipment.

It is most important, therefore, that the designing engineer should know the trunk time on the average connection. This is because all operating conditions affecting equipment efficiency obviously are covered by it and the basis, therefore, upon which the equipment may be expected to perform its functions definitely fixed. Should the subscribers in a given office be very slow in answering their telephone, such a condition must be taken into account as, other things being equal, this very peculiarity will increase the trunk time per connection.

868. *Reduction of the trunk time on the average call.*—The portion of the trunk time which is required for the operator to disconnect, can be shortened by careful supervision but special means are always necessary to shorten the time required on the average call for the subscriber to answer.

It is obvious that prompt removal of completed connections will reduce the apparent trunk time very considerably. In other words, if the operators are slow to remove the connection after the completion of the conversation, the length of time that the cord circuit is devoted to the average call is increased, while, if the operators are very keen to remove a connection as soon as the conversation is completed, the average trunk time is decreased.

This operates in precisely the same way as a reduction of the subscriber's answering time, except that disconnect time is under the control to a certain extent of the telephone company, while the subscriber's answering time ordinarily is not. One of the elements of the trunk time is the length of conversation and it is obvious that this period of time is absolutely outside of the control of the telephone company.

869. *The group of circuits.*—The central office terminals of telephone circuits at the switchboard are divided into groups. This is true whether the central office equipment is of the manual, automatic or semi-automatic type. Such a division is a necessity, due to the mechanical structure of the equipment, the matter of providing accessibility, the demands for orderly cabling of circuit wiring and to other causes.

The simplest illustration of the grouping of subscribers' telephone circuits is found in the apportionment of the answering jacks into separate operator's positions in centrally operated switchboards in which answering jacks are used. In this case the division is made on account of the limitations of switchboard space, the ability to reach distant jacks on the part of the operator, and the necessity of subdividing the load on common circuits providing the supply of energy for ringing and similar purposes.

Whatever the reason for making such a grouping arrangement may be, the answering jacks in all manually operated central offices are assembled and wired into groups of from 50 to 200 or more circuits per group. It is evident, therefore, that the traffic engineer will find himself contending with traffic conditions in groups of this size rather than with those that would be found in larger ones.

The condition is that of providing equipment sufficient to handle the traffic of small groups of circuits. When the matter is related to the number of circuits necessary to serve as trunks between groups of subscribers' lines, the groups

may be larger and the problem correspondingly simpler.

The slightest consideration of the facts will serve to point out that the fluctuations in the traffic load in a group of 100 circuits are sure to be more pronounced in character than would be the case in a much larger group of, say, 1,000 lines. At times there will not be a single call in the smaller group. This condition, in a group of 1,000 lines, is almost unthinkable. On the other hand, the small group may have a very large proportion of its circuits engaged at the same time.

The larger group will not be subject to such a large percentage of simultaneously busy lines because its lines reach a larger number of people. The laws of probability indicate that a smaller proportion of the large group is likely to call simultaneously than would be the case if the group were smaller. This is in accord with the observed facts.

870. *Traffic requirements of the group.*—It is evident that the connecting facilities to be provided for the group must be of sufficient capacity in the number of simultaneous calls that may be handled to serve the maximum number of connections in existence at any one time. This capacity must be sufficient to serve this traffic with the lowest allowable delay after the demand has been made for the service.

In other words, if the group is composed of 100 circuits and observation shows that this group will give rise to 50 calls simultaneously at certain times, it is evident that 50 connecting cord circuits, if the equipment is manually operated, must be accessible to the calls that may appear in the group.

871. *The determining traffic factor.*—The problem, therefore, is to provide connecting circuits to serve the greatest number of simultaneous calls in the associated group. Should the time be known that each of the connecting circuits will be engaged on the average call, the problem resolves itself into the determination of the number of calls that will be in existence during the period covered by the duration of the average call.

In other words, when the "trunk time" is two minutes, how many calls within the group will be in existence during any period of two minutes?

The determining traffic factor in the design of central office equipment is the number of simultaneous calls likely to occur during the period representing "trunk time" for an average connection. It is self evident that in case there are sufficient connecting circuits available to serve all simultaneous calls during the busy period, and if such circuits are relieved from each call with reasonable promptitude, the demand for service has been satisfactorily met as far as equipment is concerned.

872. *The first traffic determination.*—The first element of the traffic conditions that must be determined, therefore, is the "trunk time." Several methods that are automatic and that record the actual busy time of the connecting circuit on each call have been devised. The simplest method, and the one that is available to every telephone man, is actual observation.

The writer has spent hours in the rear of a common battery switchboard section observing the supervisory relay armatures. When the answering relay armature was operated, the stop watch would be released, and when the release of all cord relays indicated that the connection had been removed, the stop watch would be arrested. The elapsed time shown would be, obviously, the "trunk time" for the call served at that time by that cord circuit.

Numberless observations are required to determine the "trunk time" with absolute accuracy. There is good ground for supposing, also, that the average "trunk time" for any given set of conditions is not a constant. This means that regardless of the number of observations made, the result is always very likely to vary from the previously obtained average. For this reason the observation of a few hundred calls is very nearly sufficient in almost every case.

873. *The determination of the total number of calls.*—It will be found, in all probability, that the "trunk time" for traffic originating in the same class of service and from subscribers located in the same neighborhood, will, within practical limits, be the same. Should this be the case, it is of prime importance that the total number of calls originating in the groups in question should be determined.

This information is usually obtained by means of a "peg count." The name is derived from the original method used in counting calls at operators' positions. Each operator, in such cases, was provided with a strip of wood having holes drilled in the top like a cribbage board. As the calls were received at her position, the pegs were moved forward in the holes and in this way a count was recorded for the originating traffic. This method is still in use in some plants.

All modern manual switchboards are equipped with sockets for mounting mechanical counters at each position. When a call is received, the operator depresses the lever or button of the mechanical counter. In order to obtain the values of the traffic load for short periods, the counters are read by supervisors at designated times.

Suppose that the counters should be read at periods of five minutes. The differences obtained, when previous readings are subtracted from later ones, would, obviously, give for each counter the value of the traffic recorded on that particular counter. In this way the load variations for the various positions may be easily and accurately determined.

874. *Method in automatic and semi-automatic systems.*—While it is the common practice to rely upon the operator to record calls in manual equipment, it is the standard practice to record traffic data continuously on all equipment in which all or a part of the operator's functions are delegated to electrical or mechanical devices. This is possible because of the facility with which electrically operated counters may be connected to the equipment so that they will record and count each call or each part of the call for each group as may be desired. In such cases, periodical readings with the resulting deductions give the information desired for any period or for any day.

(*To be continued.*)

Consumers' League Urge Rate Increase in Cleveland.

A request that the Ohio Public Utilities Commission grant the Cleveland (Ohio) Telephone Co. permission to increase its rates has been forwarded to the state body by the legislative committee of the Consumers' League of Ohio.

The league is an organization of 2,200 women having its headquarters in Cleveland. Emphasis is placed on the wage scale paid by the telephone company and with the view of having increases given telephone company employes, the league urges the increase in rates.

To Educate Public in Needs and Limitations of Utilities.

That the citizens of Grand Rapids, Mich., may vote intelligently on future franchises and understand the needs and limitations of public service corporations such as telephone companies, lighting and power companies and street railway companies, a course in public utilities will be offered in the night schools this winter. The course will be a part of the night school curriculum at Central high school, and experts along public utility lines will address the students.

Private Automatic Exchange for Minnesota State Capitol.

A private automatic exchange is being installed in the Minnesota state capitol in St. Paul. This system is equipped with seven trunk lines, 99 telephones connecting with the various offices and departments throughout the building, and eight lines to outside points.

Citizens Company of Sheboygan to Erect New Building.

The Citizens' Telephone Co., of Sheboygan, Wis., has purchased a site for a new exchange building at North Seventh street and Center avenue, and plans to build in the near future. C. H. Bau is manager of the company.

What Is Your Company Doing?

Chats About Company Doings.

By S. R. Edwards.

The cableman working in manholes has to be constantly alert in order to avoid accidents from unexpected sources. The illustration from the Safety First Bulletin of the Texas Telephone Co. shows one danger to the underground cableman.

Gas in manholes is always more or less present, as many cablemen have learned from sad experience—but that is not the only place where explosions may be produced. Under the heading "Better Be Alive Than Careless" on another page of the bulletin, are related details of an accident which happened in Port Arthur, Texas.

There was a hole in the gasoline furnace and the cable splicer was using a torch to heat metal to close the hole. His helper was holding the furnace, when there was a quick explosion, with a light report.

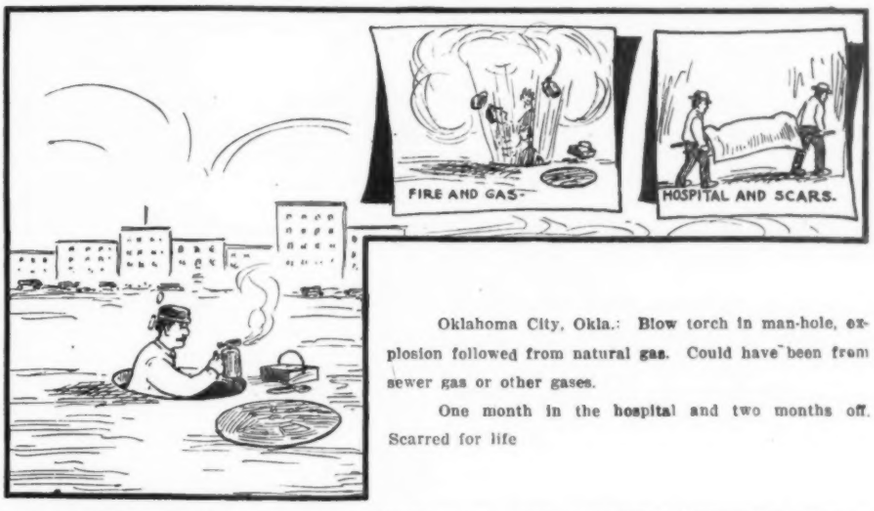
The helper was burned so quickly that he does not know how it happened, but thinks there was a gas explosion. The gasoline had been drained from the tank of the furnace and the valve and plug left open. Whatever the cause, the helper sustained burns on the fingers of his right hand and wrist. The right side of his face was scorched and he was incapacitated for five days.

"Safety First" may well be compared with "A stitch in time saves nine."

"Putting the cards on the table" is a phrase which is familiar to all telephone managers. Just what this term means is explained in an advertisement of the Modern Telephone Co. It is entitled "So the people may know," and "Service" is the keynote. The advertisement tells the public exactly where they may obtain the minutest details of the business and makes a very frank statement of the aims of the company.

Statements such as are given in the advertisement reproduced on this page are bound to be given attention by the public. There can be no question of the good will which the carrying out of such policies produce.

"If anyone believes that the girls who do duty for the Groton-Ferney Mutual Telephone Co. in Groton are not a busy bunch, let him wander over there some morning along about ten or eleven o'clock and watch them for a few moments. We venture the assertion that if he will but do that, he will be less inclined to 'crab' the next time he doesn't get an instant connection as soon as he twists the bell handle."



Oklahoma City, Okla.: Blow torch in man-hole, explosion followed from natural gas. Could have been from sewer gas or other gases.

One month in the hospital and two months off. Scarred for life

"Safety First" Bulletin of the Texas Telephone Co. and Associated Companies Tells a Story Graphically and to the Point—Actual Occurrences Are Cited as Examples.

MODERN TELEPHONE COMPANY
INDEPENDENT
TELEPHONE
INDEPENDENT CITY, ILLINOIS

SO THE PEOPLE MAY KNOW!

WE BELIEVE THAT "HE PROFITS MOST WHO SERVES BEST"

Following our best judgment, supplemented by the best obtainable advice from public administrations and judicial bodies, we constantly endeavor to conduct our business so our service will be of the greatest good to the largest number of people.

Our business methods and policies, the amount of our investment—even the dividends we pay—as well as the details of the transaction of our business, are matters of common knowledge.

Analyzed and sworn to in the annual reports to the public we publish in the newspapers and send to the State Public Utilities Commission, the minutest details of our business are taken up and explained.

We aim to give the best and broadest service to the greatest number at the lowest rate at which it can be produced and still pay a fair wage to the employe and a reasonable return to the investor.

We believe that such success as we have had has been because our business has been conducted on these lines.

Modern Telephone Company
The Independent Building
Cor. Service and Progress Sts.
Contract Dept. No. 100

The Modern Telephone Co. Runs an Advertisement Each Thursday in the Local Evening Paper at a Cost of $4.20. This is the Full Size of the Advertisement.

That is the introduction to an article entitled, "A Busy Bunch—Telephone Girls Have Much to Attend To," which appeared in a recent issue of the Groton (S. D.) Independent.

The manager of the Groton company evidently inveigled the editor of The Independent to make a call at the exchange—and then he was given personal attention. That he learned something is obvious from his closing remarks in the article:

"There are probably a number of other things which are necessary in the proper running of a switchboard that we have not enumerated. But with what we have enumerated, the girls certainly are kept going just about all of the time. Their work is surely a great ways from our idea of nothing to do."

A Proved Idea—Directory Advertising Window Display.

Everybody recognizes the value of the telephone directory as an up-to-date, accurate, and convenient address book, says The Telephone Review, through the courtesy of which the accompanying illustration is presented. The number of times a day the telephone directory is used for this purpose exceeds anything one might think. In addition to this, it is the standard guide for correcting mail addresses, forwarding express packages, and a thousand and one other uses that are foreign to the original purpose for which it is issued.

Such uses of the telephone book put it in a class by itself for advertising purposes, as there is no other publication referred to so often in the course of every day for any purpose whatever.

The realization of these facts suggested to the copy department that a window display might be made which would demonstrate the value of the telephone directory for advertising purposes. Together with the directory and traffic departments a careful study was made to arrive at a conservative figure to represent the number of times a day the New York telephone directory is referred to.

When the result was reached, a liberal deduction was made to allow for the number of times the telephone is used each day without reference to the book, and a low figure of 2,000,000 was adopted as a fair daily average over the period of the last two years.

Due to war conditions the telephone traffic has increased so tremendously in New York City that 2,500,000 would be a fairer basis at the present time, but it is conservative to say, "more than 2,000,000 times every day."

In order to impress upon the public the insistent, all-the-time publicity that this "2,000,000 chances a day medium" affords, it was decided to use the pendulum of a clock as a means of indicating the number of times per second the book is consulted and incidentally the number of chances a second that an advertiser in this book has to make a sale.

The legend on the clock reads: "Every time the clock ticks this book gives its advertiser 25 chances to make a sale."

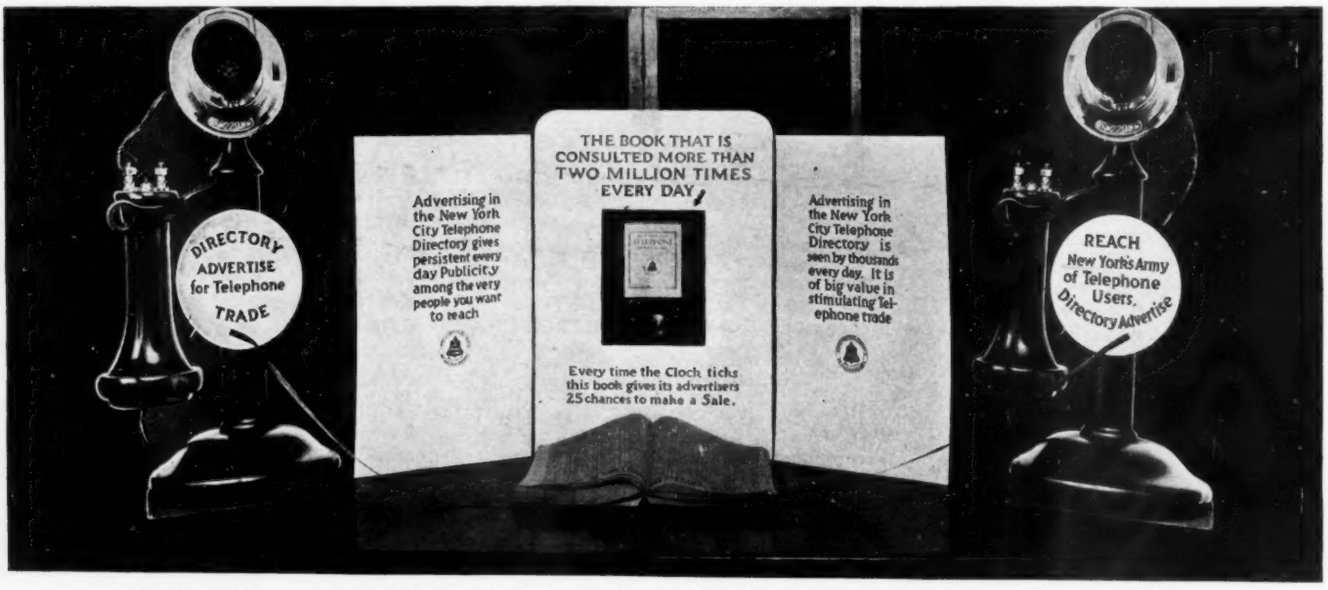
Ten of these window displays are now in use in local commercial offices—five in Manhattan and five in Brooklyn. The display was designed by W. E. Johnson of the copy department, and with the exception of certain carpenter work performed by J. Pascal and E. B. Foster, carpenters in our department of buildings and supplies, the entire display was completed in the copy department, the lettering being the hand work of Maitland de Gogorza.

What is true of the New York City directory is true only in a lesser degree of directories, in all other cities, and telephone directories are thus clearly one of the best mediums for advertising which could be used. Take any other city as an illustration, and while the directory will not be referred to 25 times every second, as it is in New York, it will be referred to in the same proportion as the telephone traffic compares to New York, and the advertiser in any other directory will get equal value.

The argument used for selling space in the New York City directory will therefore apply with equal strength to selling space in any other telephone directory, and with suitable changes in the copy used in New York, the exhibit might easily be made to apply anywhere.

Newark Telephone Adds 375 Subscribers in Three Months.

The Newark Telephone Co., of Newark, Ohio, has added 375 subscribers to its system in the past three months, making a total of 6,500 instruments in service. The new automatic rural service is being cut into service, 300 telephones having already been changed to automatic. After the remaining 100 instruments are cut over, both the Newark and Granville plants will be full automatic, both city and rural.


DIRECTORY
ADVERTISE
for Telephone
TRADE
THE BOOK THAT IS CONSULTED MORE THAN TWO MILLION TIMES EVERY DAY
Advertising in the New York City Telephone Directory gives persistent every day Publicity among the very people you want to reach
Advertising in the New York City Telephone Directory is seen by thousands every day. It is of big value in stimulating Telephone trade
Every time the Clock ticks this book gives its advertisers 25 chances to make a Sale.
REACH
New York's Army of Telephone Users.
Directory Advertise

Window Display of New York Telephone Co. Which Presents Strong Arguments for Directory Advertising.

The Index for Volume 73 of TELEPHONY

The index for Volume 73 of TELEPHONY, which was completed with the issue of December 29, 1917, is now ready for distribution among those who keep complete files of TELEPHONY. In this index are listed all the important articles which have appeared between July 7 and December 29, 1917. It will be supplied free of charge to those making application.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—This Section, "Part VI, The Valuation of Telephone Properties," Written by Chas. W. McKay

Quiz Questions on the Preceding Installment.

388. What assumption was made relative to toll service and what conclusion is therefore arrived at as to revenues?

389. What does an analysis of the exchange service revenues reveal? What does a comparison of classifications with those of this company show?

390. What three steps are in order for a solution of the revenue problem?

391. Why may 8 per cent be assumed as a fair return on the stock of a well-organized and conservatively-operated telephone company?

392. How may a table presenting an analysis of assumed revenues and expenses sufficient to produce an adequate income, be prepared?

393. What changes in the service classification of subscribers may be expected?

394. Discuss the changes made in the rates to produce the necessary revenue.

395. Outline the steps that have been discussed in the analysis of the hypothetical rate problem.

CHAPTER XX. Telephone Appraisement by Short Methods.

396. *Appraisals for Purposes Other Than That of Regulation.*—Thus far in this series of articles we have confined ourselves to a consideration of the various methods of appraisement which may be used in the presentation of telephone valuations before public utilities commissions. It is but natural that appraisals prepared for this purpose should involve a vast amount of detail.

Obviously telephone appraisals when submitted before public utility commissions, must conform strictly with the commission's requirements and their appraisal instructions must necessarily demand the inclusion of sufficient detail to facilitate a ready analysis by their experts. Unquestionably appraisals can be made, with a remarkable degree of accuracy, by short-cut methods. However, such appraisals are not readily susceptible to substantiation before courts and commissions and are, therefore, not suitable for presentation before such regulatory bodies.

There are, however, other uses to which appraisals are put, aside from that of rate regulation. These uses may be summarized as follows:

1. The appraisal as a means for determining a proper basis of capitalization.
2. The appraisal as a basis for determining fair value in the event of a proposed sale of the property under consideration.
3. The appraisal as a basis for computing depreciation reserves.
4. The appraisal as a basis for financing.

397. *Capitalization.*—It frequently happens that the capitalization of a telephone company, not subservient to the dictates of a regulatory body, does not in any way represent fair value of the company's property and business. Whether the company is over-capitalized or under-capitalized, such a state of affairs is likely to lead to undesirable complications.

The time is not far distant when all public utility companies will be subservient to some form of commission regulation. Obviously a company whose capitalization is not based upon a determination of the fair value of its property and business will, in the event of the establishment of a public service commission, be forced either to adopt rates commensurate with its capitalization or it will be confronted with the problem of explaining to the commission any discrepancy between the value of the property as carried on the books and the value as determined by commission appraisement.

398. *Sale of Property.*—When a telephone company is considering either the sale of its own property or the purchase of any property, both buyer and vendor naturally wish to know the monetary value as determined by appraisement.

The determination of such value must be predicated upon the consideration of two equally important factors: First, reproduction cost; and second, present or depreciated value.

399. *Depreciation Reserves.*—Another use to which the appraisal is frequently put, and a use which has already been discussed in some detail, is in connection with the determination of reserve funds. It is hardly necessary to enlarge upon this phase of appraisal work, in view of the discussion presented in Chapter XVII on Depreciation.

400. *Financing.*—When a telephone company applies to a banking house for a loan on its property, one of the first questions to be considered is the value of the property as determined by appraisal. In this case, and in the case of the other three appraisal uses outlined in the foregoing paragraphs, unless a company is obligated to meet requirements imposed by local or state regulatory bodies, it is only necessary to determine a reasonably accurate valuation of the property. The company, therefore, will be warranted in basing its valuation upon short-cut appraisal methods.

Such appraisals, if made by entirely disinterested outsiders, are rarely subject to question. Bankers, for instance, in passing upon the merits of the risk, are concerned primarily in the value of the property and, once assured that the valuation has been made by a competent and disinterested expert, they are not likely to question the method of appraisement or be interested in detailed inventories.

401. *Various Methods of Short-cut Appraisement.*—Several schemes have been advanced for appraising public utility properties by short-cut methods. Electric light properties are sometimes evaluated on the basis of the cost per capita; $20 to $30 per capita will give some idea of the value of a three-phase alternating current electric light plant located in a town of from 5,000 to 10,000 population.

The value of common battery telephone plants may be determined approximately by applying a cost per station of from $125 to $200—the exact amount to be used in a specific case depending upon the size and individual characteristics of the plant under consideration. Magneto telephone plants, situated in small towns, may have a value of from $50 to $100 a station.

If the plant under consideration contains only a small amount of aerial cable and no subway, the cost of the physical property may be as low as $50 or $60 per station. The cost per station varies directly with the amount of cable and conduit.

Another approximate method of determining the value of telephone properties is based upon a consideration of revenues, expenses and net earnings.

All of these methods of approximate valuation are obviously extremely broad-gauged and are suitable for use where only a very rough idea is desired of the value of the property. There are, how-

ever, other short-cut methods of appraisement which may be used in telephone valuations with the assurance that the results will represent nearly as accurate a determination of property values as if the appraisal were made in accordance with the more detailed methods described in previous chapters. It is the purpose of this chapter to outline these methods and to show how they may be applied to specific telephone appraisal problems.

402. *Land.*—A reasonably accurate idea of the value of land used for telephone purposes may be had by determining the value per square foot of adjoining and equally desirable property and applying the unit cost thus determined to the land under appraisement.

A fair value per square foot may be determined by consulting records of recent real estate transfers in the locality in which the land under consideration is located and by consulting local real estate men and property owners as to probable land values at the time of the appraisal.

403. *Buildings.*—The most prevalent approximate method of determining building values is by what is known as the cubic foot basis. The cubical contents of the building is first estimated and the building appraised at a unit cost per cubic foot—this cost being dependent upon the size and type of the building under consideration. Obviously a different cost per cubic foot will be used in the case of a frame building than would be used in the appraisement of a modern concrete structure.

Most telephone engineers have in their possession reasonably accurate figures as to the cost per cubic foot of various types of telephone buildings. In making use of such figures, however, every effort should be made to determine their fairness at the date of the appraisal for, during the past two or three years, building costs have doubled and, in some cases trebled.

404. *Right of Way.*—The method of approximate appraisement of right-of-way does not differ radically from the more detailed methods discussed in previous chapters. A right-of-way unit cost per pole should be determined and this cost should be weighted to allow for the relative proportion of the total number of poles located on private and public property respectively.

Perhaps a simpler and even quicker method is to arrive at a right-of-way cost per mile of pole line—making due allowance for the location of the poles. One unit cost may be derived for city poles on public property, another for city poles on private property, and still another for rural and toll poles.

405. *Outside Plant.*—Numerous methods have been devised for making approximate inventories and appraisals of a telephone company's outside plant. Most of these methods, however, are so broad-gauged that unless they are employed by one who has had a good deal of appraisal experience they are not likely to give satisfactory results.

It is proposed to outline briefly several of the more approximate methods and then to present a method that involves more detail but will result in an appraisement compiled in an orderly manner and susceptible to subsequent analysis.

406. *Very Approximate Methods.*—One of the more approximate methods frequently employed is to determine a cost per station for the outside plant, weighting this cost per station to allow for the relative amounts of underground conduit, aerial cable and open wire construction as found in the plant. Another method is based upon a preliminary and necessarily rapid survey of a portion of the plant under appraisement, noting the average number of poles per block, the average number of cross arms per pole and the average number of wires per cross arm.

With these data as a basis, the appraiser can take a map of the plant, count the number of blocks of pole line and thus determine the total number of poles and cross arms and the total length of wire. Aerial cable may be scaled directly from the map, making suitable allowances for terminals, pole seats, etc. Underground conduit and underground cable lengths may also be estimated from the cable maps used in connection with the company's subway records.

Still another method that may be used for approximate appraisement is based on an actual rapid field count of all of the poles. The appraiser may drive over the plant with an automobile, following the main pole leads and making estimates of the quantities involved in branch leads—from observations recorded at points of intersection of the branch and main leads.

Numbers of poles may be recorded by the use of a pole or peg counter, no attempt being made to classify poles by height or size. The appraiser may make sufficient side notes as to the average height of pole found in the plant and the average equipment per pole, to aid in subsequent appraisement of this rough inventory.

Aerial cable, underground cable and conduit may be taken directly from the records, or the lengths involved may be estimated approximately by the tachometer of the automobile.

(To be continued.)

Marion County (Ohio) Company Conducts "Open House."

During the two days of formal opening of the new automatic exchange of the Marion County Telephone Co., of Marion, Ohio, about 1,600 friends and patrons of the company visited the plant and witnessed the operation of the girlless equipment.

New Home of Elyria Telephone Co. Nearing Completion.

The new home of the Elyria Telephone Co., of Elyria, Ohio, which is to house new full automatic equipment, is rapidly nearing completion and is expected to be ready for occupancy in January. The entire program represents an outlay of over $150,000, but the company has been so financed that the entire capitalization when all the construction work has been completed, will be only about $75 per station.

The magnificent $30,000 building, when completed, will house the company's general offices, the automatic central office equipment, the new six-position toll board, together with the various departments connected with the conduct and maintenance of the plant.

The site, which is at the telephone center of the city, was formerly occupied by the building used by the company since 1905. This structure, containing the manual switchboard now operated by the Elyria company, was lifted from its foundations and moved 50 feet, without interfering in any way with the service. This feat involved some very intricate problems, and was successfully carried out under the personal supervision of A. J. Curren, president and general manager of the company.

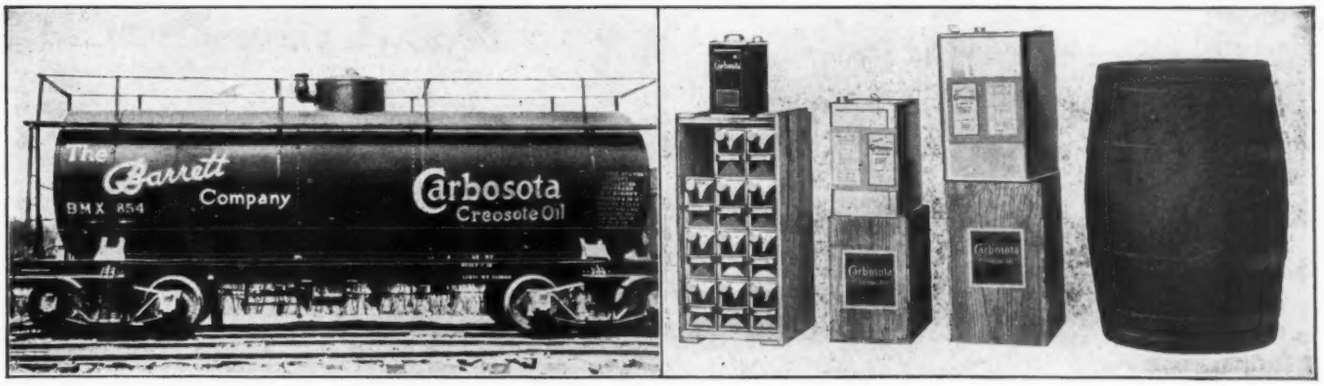
To the rear of the new building a garage has been built which harmonizes in architecture with the exchange building. The garage is 66 ft. long and 30 ft. wide, and is equipped with the most modern devices for the efficient handling of the company's fleet of motor trucks and automobiles.

The exchange building itself will be 52 ft. wide and 72 ft. deep, and will have a high basement and two floors. The walls will be of cream colored stucco over hollow tile, with tapestry brick pilasters and stone copings. Medallions set in the center of each section of the wall will bear facsimiles of the automatic desk telephone. The structure will be entirely fireproof, the furniture and trimmings being of pressed steel.

In the basement will be the power plant, the heating and ventilating systems, a pressure tank for the pneumatic tubes, which will carry tickets from the toll recording desk and complaint desk, and the vacuum cleaning equipment.

The first floor will contain the tile-floored lobby, the public office with marble and bronze cashier's screen, and public pay stations, the general manager's office and directors' room, and in the rear the terminal room, engineer's office and repair shop.

The entire second floor is devoted to the operating department. Here will be located the automatic switchroom, the toll board, chief tester's, information and complaint desks, and the rest room for the women employes.



Tank-car (10,000 gallons), 1-gallon can, 5-gallon can, 10-gallon can, 1 wooden barrel.
(Any quantity may be conveniently obtained.)

Pure Coal-Tar Creosote Oil

has proved to be the *most efficient* of all wood-preservatives.

Carbosota Creosote Oil is simply that, refined and made physically fit for use in the Open-Tank Process and by the Brush Method.

Specify Carbosota — Don't Experiment. Carbosota conforms to a *standard* specification, which assures a pure, high-grade oil, refined to meet the physical requirements which are essential to the success of non-pressure treatments, combining highest toxicity practicable with low viscosity and permanence.

Briefly, Carbosota Creosote Oil meets the three chief requirements of non-pressure treatments to the fullest extent, namely:

Efficiency — It has proved to be the most effective protection against decay for structural wood. Coal-tar creosote has been used for nearly four score years in this country. Its consumption in the wood-preserving industry has reached more than 100,000,000 gallons annually, due exclusively to merit.

Economy—Carbosota Creosote Oil employed in the Open-Tank Process or by the Brush Method is economical and simple. The expense of treatment represents a proportionately small percentage of the cost of lumber.

Convenience — Carbosota Creosote Oil is obtainable in packages of convenient size throughout the country and is always uniform. Its physical characteristics permit its use under practically all conditions, as it remains liquid at temperatures below which work would not generally be carried on.

Thus wood-preservation is placed within the reach of the smallest as well as the larger consumers.

As the largest producers of Creosote Oil in the United States we are able to maintain a standard of service which cannot be equaled, and this is at the disposal of all who may be interested in wood-preservation. Detailed data and technical assistance may be obtained by addressing nearest office.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases, and treatment modified accordingly.)

Technical assistance and information regarding the CARBOSOTA *treatment free on request.*

The Barrett Company

New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Cincinnati, Pittsburgh
Detroit, Birmingham, Kansas City, Minneapolis, Nashville, Salt Lake City, Seattle, Peoria

THE BARRETT COMPANY, Limited
Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S., Sydney, N. S.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Subscriber Not Permitted to Make Extension to Telephone.

A. T. Galloway, a miller at Oakdale, Neb., complained to the Nebraska State Railway Commission some weeks ago that because he was forced to use a party line to the Northwestern depot important messages he had telephoned to be wired had leaked. The commission ordered the Oakdale Telephone Co. to place him on an individual line. It did so, and then, in turn, haled Mr. Galloway before the commission.

The telephone company complained that, unknown to it, Mr. Galloway had installed a little device of his own which amounted to giving him a private exchange of his own. In addition to subscribing for service at his residence and office, Mr. Galloway had also placed an extension of his office telephone in his mill. By a device he had rigged up he could talk between mill and office with the outside world barred out. He also had a switch in his office that he could turn when he left it so that all calls thereto went into the mill.

The commission held that no subscriber to an exchange has a right to bar the public from the use of his instruments in calling him; and that the right of the subscriber was paramount to his desire to operate a private line of his own. It ordered him to take out the device and also ordered the company to charge him for two telephones on a two-party line rate.

Free Service Attached Only to Subscribers' Own Telephone.

The Nebraska State Railway Commission has ruled in two recent cases before it that a telephone company has the right to charge for any message or use of its facilities by subscribers when they attempt to utilize telephones other than the ones for which they pay rental. The commission holds that the rental paid for a telephone restricts the subscriber's free use to that instrument, and that a company may, if it desires to do so, require the payment by him of any reasonable charge when he uses another instrument for messages.

The telephone exchange at Alma gives free service over a considerable territory. One of its subscribers at the home town is the Alma Produce Co., which employs traveling representatives. The produce company can talk without any extra charge to any one of half a dozen different towns, and when the telephone company insisted upon charging its traveling men who called up the home office from towns within the free zone, the company complained to the commission. The latter holds the charge to have been properly made, as the free service for the Alma company attached only to its own telephone.

The other case, which involved the same principle and to which the same rule was applied, came from farmers in the neighborhood of Farnam and Cambridge. The telephone exchange at Orafino, Frontier county, gives free service to Cambridge and Farnam, at opposite points of the compass north and south, to all rural subscribers. When one of these was in Cambridge or Farnam and desired to talk to a friend in the other town, the company charged a toll, which led to the dispute.

Bell Toll Connections with Fulda Exchanges Restored.

The Minnesota Railroad & Warehouse Commission, on December 20, ordered that the connections now existing between the toll lines of the Northwestern Telephone Exchange Co. and the exchanges of the Fulda Telephone Co., located at Heron Lake, Rushmore, Storden, Westbrook and Brewster, be maintained. The commission ordered, further, that the Northwestern Telephone Exchange Co. pay to the Fulda Telephone Co. for the handling of its toll business at these points, five cents for each originating message and five cents for each terminating message passing over the lines of the Northwestern Telephone Exchange Co.

This case was brought about by reason of complaints from citizens of Heron Lake and Brewster, Minn., because the Northwestern company disconnected its toll lines from the exchanges of the Fulda company, previously mentioned.

For a number of years there existed a connection between the Northwestern toll lines and the exchanges of the Fulda company at Heron Lake and Rushmore under a contract, the terms of which provided for payment by the Northwestern to the Fulda company upon the basis of 20 per cent on originating or outgoing business, and 10 cents on each incoming or terminating message.

In 1910 the Fulda company entered into contracts with the Northwestern company for a connection of the toll lines of the latter company with its exchanges at Westbrook and Storden, under the terms of which the Northwestern agreed to pay the Fulda company five cents upon each incoming and outgoing message over the lines of the Northwestern company. These two contracts also provided that either company could terminate the agreement by giving 30 days' written notice of such intention to the other company.

Under date of November 9, 1914, the Fulda company wrote the Northwestern company advising that as it caused considerable confusion to figure monthly settlements on different bases, it desired thereafter to figure its reports on the business at all of its stations in the same manner as at Heron Lake.

The Northwestern company paid no attention to this letter, but the Fulda company contended that the purpose of the letter was to notify the Northwestern company of its intention to terminate the contracts covering the connections at Storden and Westbrook.

The commission was of the opinion that this letter could in no way be considered as a proper notice by the Fulda company to terminate the contracts with the Northwestern company for the connections at the points referred to.

Since that time the Fulda company in calculating its settlements with the Northwestern remitted to that company on the basis of its contracts for Heron Lake and Rushmore, which method of settlement resulted in a considerable balance being due the Northwestern by reason of the toll business originating and terminating at the points of connection other than Heron Lake and Rushmore.

Because of the accruing indebtedness resulting in the Fulda company's failure to settle for the business at Storden and Westbrook upon the basis of five cents for each originating and terminating message over the lines of the Northwestern, the Northwestern company disconnected its toll lines from all exchanges of the Fulda company where connections existed, on September 1, 1915, which also had the effect of abrogating all of its connecting contracts with that company.

The commission having received complaints which stated that the public was being put to considerable inconvenience because of the disconnection of the toll lines with the exchanges referred to, immediately requested the telephone companies affected to enter into negotiations with a view of re-establishing the toll line connections. The companies failed to agree upon terms, and an informal hearing was held in the office of the commis-

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These Substation Protectors

Reliable

have been approved by the National Board of Fire Underwriters.

You can put them on the hardest job and they'll deliver big satisfaction. Does "certified protection" interest you? Protection which is approved and guaranteed to be **right!**

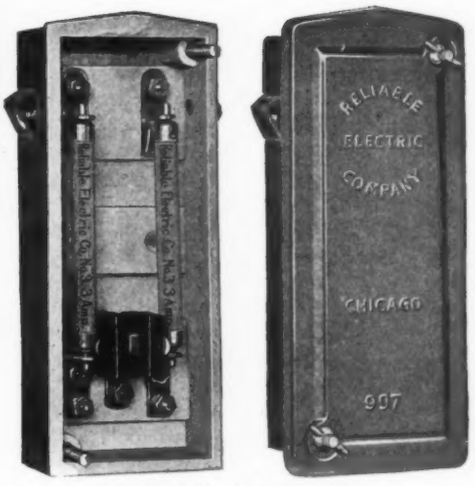
These efficiently designed RELIABLE protectors are only six of the forty-nine styles for substation purposes which we make. Yet, every type is thoroughly simple, so that heavy maintenance expense is impossible.

Furnished in almost any equipment desired, which is another interesting feature of RELIABLE service of giving telephone companies what they need.

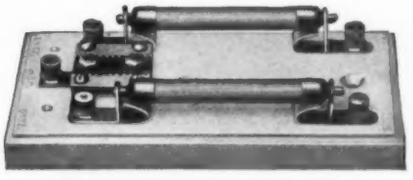
Which style protector herewith interests you? Shall we send further particulars and prices?

Reliable Electric Company

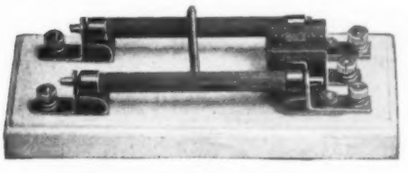
411-417 S. Sangamon St. Chicago, Ill., U. S. A.



Reliable No. 997 Protector



Reliable No. 998 Protector
(With or Without "All-Over" Cover)



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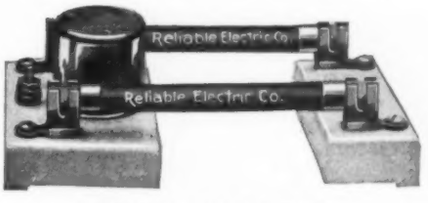
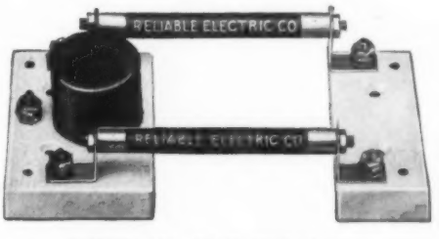


Reliable No. 977 B Protector



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Reliable No. 976 Protector
(With or Without "All-Over" Cover)

Reliable No. 976 Protector
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sion on December 1, 1915, at which representatives of both companies were present.

At this hearing the Northwestern company agreed to re-connect its toll lines with the exchanges of the Fulda company at once, the terms of settlement to be considered at an adjourned hearing, to be held before the commission on February 8, 1916, at which time the companies were to be given an opportunity to present testimony showing the cost of originating and terminating long distance messages, together with such other service as is performed by the connecting exchange in the handling of the toll business.

The hearing came on as arranged for, the Northwestern and the Fulda companies being only represented by officers of the companies, there being present also representatives from several Independent companies, whose exchanges were connected with the toll lines of both the Northwestern Telephone Exchange Co. and the Tri-State Telephone & Telegraph Co.

The Northwestern company has in force something over 300 contracts covering the connection of its toll lines with the exchanges of smaller Independent companies throughout the state, more than 90 per cent of which provide for payment by the Northwestern to the connecting company of five cents for each originating or outward message, and five cents for each terminating or inward message over the toll lines of the Northwestern company.

The company maintains that five cents per message is not supposed to be a distinct compensation on an "in" or "out" message but an easy method of computation of a sum fully adequate to meet all expenses of an operating company handling the toll business for another company and is arrived at by taking all the expense in connection with the operation of toll messages.

The Northwestern company presented several witnesses representing connecting companies who testified that they were fully satisfied with the five-cent per message settlement; that it fully covered their cost of handling the long distance business of the Northwestern company originating and terminating at their exchanges, and in some cases considered that there was some profit.

The Fulda company could not present any actual figures to show what it cost to take care of toll business at its exchanges, but presented exhibits covering such costs, which were purely estimates and based upon mere conjecture. The Fulda company contended that although the toll lines of the Northwestern company were connected with Heron Lake and other of its exchanges, messages passing over the lines of the Northwestern company in many cases did not originate and terminate at those exchanges but originated or terminated at exchanges inland and passed over the toll lines of the Fulda company in reaching those exchanges.

It also contended that no provision had been made whereby the Fulda company received any compensation for such messages as passed jointly over the lines of the Northwestern and the Fulda companies; that the five-cent per message basis did not compensate for the Fulda company's portion of the line haul, and for that reason insisted on a basis of settlement at least in amount as provided for in the contracts covering the connections at Heron Lake and Rushmore.

The Northwestern company having offered to settle with the Fulda company upon the five-cent "in" and "out" basis, and this offer being refused by the Fulda company on the ground that it is in a different situation, threw the burden upon the Fulda company of getting the facts as to the cost of handling the toll business at its exchanges before the commission to show as to whether the compensation to them is unreasonable. This it failed to do.

The commission held that if the Fulda company considers that it is entitled to compensation for its portion of joint messages handled over its lines and that of the Northwestern company, it should enter into negotiations with that company for the establishment of rates covering such business.

Upon consideration of the facts in this case, the commission was of the opinion that the existing connections between the toll lines of the Northwestern company and the exchanges of the Fulda company should be maintained and that for the purposes of this case and without prejudice, the basis of settlement between the companies should be upon the basis of five cents for each incoming and outgoing message until such time as the commission, upon complaint or upon its own motion, shall have determined after an investigation that some different rate of compensation should apply to different classes of exchanges or to the particular exchanges affected by this case.

Charging Higher Than Published Rates for Calls in Hotels.

The question of whether local hotels may engage in the telephone business to the extent of owning their own booths and charging ten cents for calls where the published rate of the telephone company is five cents was discussed at a hearing before the Massachusetts Public Service Commission December 20.

Representatives of the Copley-Plaza, Lenox, Brunswick, and Thorndike testified that they had made the increased rate in order to exclude those telephone patrons who were not guests of the house in the sense of hiring rooms or dining there. Outsiders, they say, had caused inconvenience to the guests, whose calls frequently were delayed because the booths were occupied. They admitted the room of each guest was equipped with a telephone at which the rate also was ten cents.

Certificate of Convenience to Enter Occupied Territory.

The Coles County Telephone & Telegraph Co. has been granted by the Illinois Public Utilities Commission a certificate of convenience and necessity to construct and operate a telephone exchange in the village of Ashmore. The Coles County company has had an exchange at Charleston and has served Ashmore township and several subscribers in the village of Ashmore through its exchange at Charleston.

The Ashmore Mutual Telephone Co. has had an exchange in Ashmore and has furnished service to its residents. The service has become very poor and unsatisfactory, and the lines are in a dilapidated condition. The commission, in an order of February 5, 1917, ordered the Ashmore Telephone Co. to improve and build up its lines. This has not been done, and the service remains inferior.

Residents of Ashmore are desirous that the Coles County Telephone & Telegraph Co. be allowed to enter the village. The Coles County company furnishes service to 5,500 subscribers, and maintains four exchanges. Telephone users in Ashmore township have filed petitions setting up the poor condition of the Ashmore company and asking that the Coles County company be allowed to furnish service in the township and village.

The commission states that since February 5, 1917, the Ashmore has had ample time to rebuild or improve its lines, but has not done so, and further time should not be allowed for that purpose. The commission, therefore, gives the Coles County company permission to enter the territory and furnish service to the residents of Ashmore.

Telephone Company Charged Fee for Crossing Railroad Lines.

The Nebraska State Railway Commission has ordered the Union Pacific Railroad Co. to stop its practice of requiring telephone companies whose wires cross its rails to take out licenses and enter into contracts, or else show cause why it should be permitted to do so.

The complaint was filed by L. J. Van Antwerp against the Union Pacific and the Northwestern. The latter company was able to get into the clear by declaring that only where the crossing was made on private land did it require a license and contract. It also charged rental where the poles ran longitudinally along the right of way.

The Union Pacific answered that it was requiring these wherever the tele-

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phone companies crossed its rails. The attorney frankly said that perhaps there was no legal authority for requiring this, but the railroads were there first and they had a right to protect themselves from liability for damages in the future. He said that the records and information were desired so that in case of an accident the company could at once find out when the wires were located and the character of the construction. The rate charged was merely sufficient to pay for the expense.

The commission holds that so far as this relates to crossings on public highways there is no justification for the requirement or for the collecting of any fee. If the railroad company desires to keep a record of such crossings it must do so at its own expense and has no legal right to make a telephone company foot the expense bill.

However, if the railroad company thinks it can sustain its contention in a suit at law, the commission would first like to know on what grounds, and so gives it the choice of the two alternatives.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

December 16: Hearing on the Pacific Telephone & Telegraph Co.'s blanket application for an increase in its rates, tolls and rental charges throughout the state.

December 17: The commission authorized the Pacific Telephone & Telegraph Co. to operate under a franchise granted it by the town of Sausalito, provided the telephone company will never claim before a public body any greater value for the franchise than $271.75, the amount paid for it.

January 4: Rehearing of the Pacific Telephone & Telegraph Co.'s plan to increase rates and do away with free tolls in Orange county.

DISTRICT OF COLUMBIA.

January 4: Hearing resumed in the District building for the purpose of considering the application of the Chesapeake & Potomac Telephone Co. for permission to put into effect certain increases in rates for telephone service and for the abolition of certain classes of telephone service now furnished.

FLORIDA.

December 19: Z. D. Adair, general manager of the Ponce de Leon Telephone Co., cited to appear at Tallahassee and show cause why he should not be punished for failure to furnish certain information requested by the commission. No. 164.

ILLINOIS.

January 2: Hearing at Springfield on the application of the Teutopolis Telephone Co. for authority to increase its telephone rates in Teutopolis and vicinity. No. 7472.

January 3: Hearing at Springfield in the case of Sam Crosby vs. the LeRoy Telephone Co., on complaint as to telephone service at LeRoy. No. 7271.

January 3: Hearing at Springfield in the case of Thos. P. Edwards vs. the Ashland Telephone Co., on complaint as to telephone service at Ashland. No. 7528.

INDIANA.

December: The commission ordered the Dunlaps Telephone Co. of Elkhart, Ind., to install a telephone in the home of J. M. Teall, a farmer living northeast of Elkhart. Four years ago Mr. Teall, who lives on the north side of the St. Joseph river, asked to have a telephone installed, but the Dunlaps company announced that it would accept no new business and refused to install the telephone. Mr. Teall then filed a petition with the public service commission, which held two hearings in the matter before handing down its decision.

December 21: Petition filed by the Akron Telephone Co., of Akron, Ind., for permission to increase its capital stock from $5,000 to $35,000.

KANSAS.

January 3: Oral arguments to be heard at Topeka on application of the Southwestern Bell Telephone Co. to increase rates at Leavenworth and Wellington.

MASSACHUSETTS.

December 20: Hearing on the practice of hotels in charging ten cents for a telephone call for which the commission has set five cents as the price. The question involves the right of the New England Telephone & Telegraph Co. to sell its service in bulk to be retailed at a price other than what the commission has prescribed.

MINNESOTA.

December 20: The commission ordered that the connections now existing between the toll lines of the Northwestern Telephone Exchange Co. and the exchanges of the Fulda Telephone Co., at Heron Lake, Rushmore, Storden, Westbrook and Brewster, be maintained and that the Bell company pay to the Fulda company for the handling of its toll business at these points five cents for each originating message and five cents for each terminating message passing over the lines of the Northwestern company.

January 10: Hearing at New Richmond in the matter of the application of the New Richmond Telephone Co. for permission to increase its local telephone exchange rates at New Richmond and Waldorf, Minn.

January 14: Hearing at Pine Island in the matter of the application of the Pine Island Telephone Co. for authority to change its local telephone exchange rates at Pine Island, Minn.

NEBRASKA.

December 24: Application of Cuming County Independent Telephone Co. for permission to make five-cent charge for calls on local exchange at Wisner by non-subscribers, granted.

December 24: Order issued, on complaint of L. V. VanAntwerp, requiring Union Pacific Railroad Co. to show cause why it should not stop practice of requiring telephone companies to pay license fee for crossing road with wires on public highways.

December 24: Complaint of N. E. Austin, of Stockville, that the Bartley Mutual Telephone Co. refuses to pay switching charge authorized by the commission. Mr. Austin runs an exchange that does a switching business for farm lines. On a showing recently made he was permitted to increase this charge to 40 cents a month for each telephone switched. All of the farm line companies save the Bartley agreed to pay. Mr. Austin was authorized to notify the Bartley company that if it did not agree to pay the established rate within ten days service would be cut off.

December 26: Nebraska Telephone Co. given permission to cancel grounded service on Lexington exchange, it appearing that no such service is called for and none is being given.

December 26: In the complaint of Oakdale Telephone Co. against A. T. Galloway, it was ordered that defendant pay for two telephones on party line base and that he remove cut-out system operated for private benefit and against public interest.

December 26: Application of Nebraska Telephone Co. for permission to publish toll rates from newly established exchanges at Antioch, Hoffland, Ellsworth and Lakeside, approved.

December 26: In the application of Glenwood Telephone Co. for publishing of revised rate schedule, company ordered to abolish all discriminatory rates wherein stockholders were charged $10 a year and non-stockholders $18 a year for service, and to put into effect a schedule establishing the rate of $1.25 a month for all subscribers, business, residence and farm, on all of its 12 exchanges, with free interchange between all. Company authorized to charge $16 gross and $15 net on Holstein exchange, but request that it be permitted to charge interest on deferred payments denied, the $1 difference between yearly advance payments and gross covering that expense.

December 26: Application of Citizens Telephone Co., of Paxton, to charge 40 cents gross and 35 cents net, when paid a year in advance, for switching service, instead of 35 cents, as at present, approved.

December 26: Application of Nebraska Telephone Co. for permission to reduce toll rate from Litchfield to Mason City, filed.

January 7: Arlington Telephone Co. ordered to show cause why it should not be required to make good its depreciation fund out of dividends paid to stockholders.

January 15: Hearing of complaint of the Farmers' Independent Telephone Co., of Red Cloud, against the Lincoln Telephone & Telegraph Co.

OHIO.

December 17: Request filed by the Consumers League of Cleveland urging the commission to grant the Cleveland Telephone Commission permission to increase its rates.

January 8: Hearing on joint application of the Fremont Home Telephone Co. and the Bell company to consolidate their Fremont properties.

PENNSYLVANIA.

December 18: Notice filed by the White Deer Telephone Co., operating in Montgomery and vicinity, of an increase in the rate for local calls from 5 to 10 cents.

December 21: Notice filed by the Slate Belt Telephone & Telegraph Co., of Nazareth, increasing its rates.

WEST VIRGINIA.

January 25: Hearing on the application of the Littleton Telephone Co., of Littleton, Wetzel county, for authority to make a general increase in its service rates. The company asks permission to increase the rate for a privately-owned telephone in a private residence on a party line, from $8 to $11 a year; a company-owned telephone in a private residence on a private line, from $10 to $13 a year; business telephone, from $18 to $25 a year.

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Inductive Interference Report

Joint Committee on Inductive Interference Presents Its Final Report to California Railroad Commission After Investigation Extending Over Five-Year Period—Review of Investigation Work—What the Final Report Includes

With the presentation of its final report, dated September 28, 1917, which has just been made public, the Joint Committee on Inductive Interference, which has been investigating for the past five years, under the auspices of the California Railroad Commission, the disturbances in communication circuits caused by induction from neighboring power circuits, announces the conclusion of its work.

A preliminary report was rendered by the committee in 1914. Besides a discussion of technical features of the problem, rules were recommended to the California commission to regulate the practices of companies operating power and communication lines in proximity to each other. These recommendations were embodied in General Order No. 39 of the commission, which has been in force since August, 1914.

What Report Includes.

The final report just issued and based on more extensive investigations conducted since 1914, includes:

1. An historical sketch, regarding the formation, personnel, organization, investigations and finances of the committee.

2. A review of the basic principles, comprising a simple statement of the nature of the subject, a summary of the facts established or agreed upon, and a concise statement of the guiding principles for the prevention of interference.

3. Recommendations for revised rules to govern the design, construction and operation of power and communication lines and associated apparatus, to prevent or mitigate inductive interference, followed by explanatory comments.

The new rules mark a considerable advance both in substance and form as compared with the 1914 rules. The principle of co-operation in determining means for avoidance or mitigation of interference is emphasized, in conjunction with definite guiding rules, where such are practicable.

Certain precautionary measures are made applicable to all new construction. The principle of employing the remedial measure involving least total cost for a given benefit, irrespective of whose plant is changed, is declared.

An exhibit accompanying the rules, discusses the arrangement and spacing of power conductors.

4. Five appendices complete the report, dealing with:

(1) Interference not covered by the recommended rules, which apply to constant-potential alternating current power circuits of over 5,000 volts between wires, or 2,900 volts to ground, and exclude telephone subscribers' loops.

(2) List of technical reports prepared by the committee as a record of its investigations.

(3) Comments on the 1914 report.

(4) A bibliography.

(5) A chart showing the organization of the committee.

Origin of Investigation.

The development of the power and communication services in California brought to a climax in 1912 the problem of interference by induction. The California Railroad Commission was called upon to adjudicate several cases of proposed power line construction paralleling long distance telephone, telegraph and railway signaling lines, which had been protested by the telephone interests.

Before these cases came to a formal hearing, however, the companies principally concerned, reached an agreement, which was approved by the commission, to make a field investigation of the physical conditions involved in such interference. About two months later the commission called a conference of representatives of the various interests in California, which was held on December 16, 1912, resulting in the formation of the Joint Committee on Inductive Interference, composed of engineers representing the railroad commission, railroads, power, telephone and telegraph interests of the state. This committee, which was authorized to investigate and report to the commission, took over the field work which had already been started by the companies as referred to above.

Experimental Investigations.

Under a sub-committee on tests, experimental investigations were conducted upon several long parallels involving a 22-kilovolt, three-phase, 60-cycle system isolated from ground, and a three-phase, 60-cycle system with lines of 22, 33 and 55 kilovolts, having grounded neutrals at one or more points, with long distance telephone, telegraph and railway signal lines. Most of these tests were made at Morgan Hill, Salinas and Santa Cruz, with the aid of a rather elaborate field laboratory, many of the tests being conducted with the power lines in normal operation.

A great amount of computation was required to analyze the experimental results, and besides this, theoretical studies were carried out. Much effort was required to develop suitable methods of measurement and to calibrate the instruments employed.

In the interest of a general survey of interference conditions in the state, information was collected from the several companies, concerning the parallels in which they were involved. Observations of the residuals of two grounded-neutral systems were carried out with a small portable outfit for measuring the magnitudes and frequencies of the harmonic residuals at five different points besides those where the field laboratory was set up.

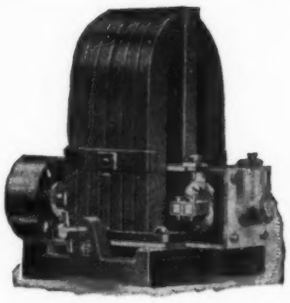
In giving its approval to the first report of the committee, the railroad commission authorized the continuance of the investigation to secure more definite information concerning the effect of transpositions and the causes and effects of residuals. In carrying out this program, the field laboratory was moved to San Fernando where a 15-kilovolt circuit, 37 miles in length, paralleled by a telephone circuit on the same poles, was entirely at the committee's disposal for several months.

During this time the factors affecting the residual voltages and currents of power circuits, whether isolated or with grounded neutrals; the effectiveness of transpositions in neutralizing inductive effects; and the magnitude of inductive effects in short uniform non-transposed sections of parallels, were experimentally investigated.

Continuance of Investigation.

Investigations of residuals included the effects of transpositions, leakage, accidental grounds and frequency of alternations up to 1,000 cycles, for systems isolated from ground; and for grounded-neutral systems, the magnetic density of the transformers and various connections of the transformer banks. In the Transactions of the A. I. E. E., Vol. 34, pages 2,113 to 2,125, a more extensive description is given of the San Fernando investigations.

The subjects experimentally investigated at San Fernando were made the subjects of intensive theoretical studies. In conjunction with the work on induction in short uniform untransposed parallels, calculations were made to determine the accuracy with which the interference could be predicted by computation. Since June, 1915, the headquarters of the field engineering staff have been at San Francisco, where these studies and the later work of the committee have been carried out.



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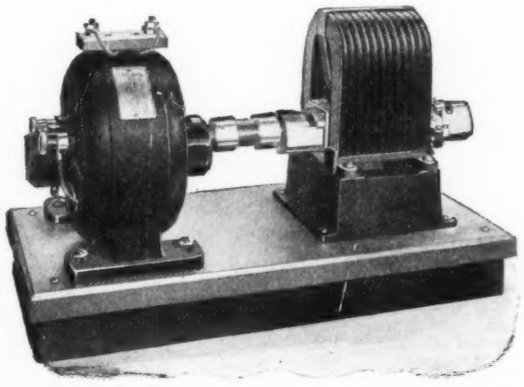

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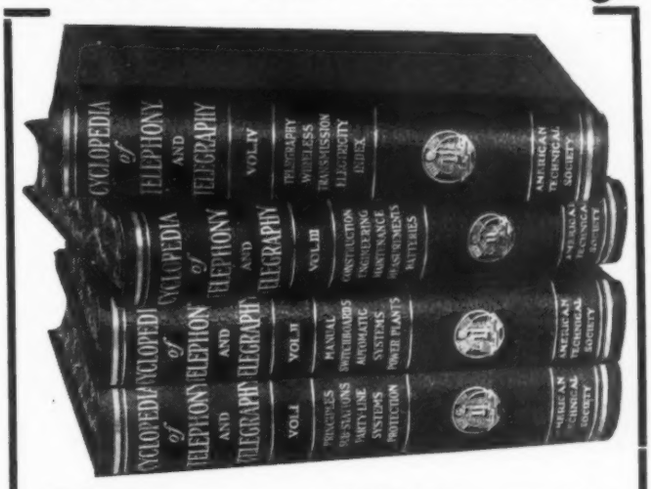
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The results obtained at San Fernando showed that it was feasible to study by means of computations the effect of variation of spacing of conductors, separation of power and communication lines, size of conductors, heights above ground and configuration, on the intensity of induction. A study has been made covering the configurations, relative positions, etc., most commonly occurring for three-phase lines, the results of which are embodied in Technical Report No. 65 of the committee, comprising 214 curve sheets and over 3,000 curves.

Coincident with its investigations, the committee arranged for tests by the American Telephone & Telegraph Co., Western Union Telegraph Co. and the Postal Telegraph-Cable Co. to determine the detrimental effects of extraneously induced currents on the operation of telephone and telegraph receiving apparatus—that is, the interference due to specified amounts of current of a given frequency in telephone receivers and in telegraph relays.

Detailed Records of Investigations.

The detailed record of the investigations of the committee is contained in a series of 71 technical reports. Thirty of the reports have been selected as being of sufficient general interest to warrant their publication along with the two reports of the committee to the California Railroad Commission.

The reports include not only records of tests and their analyses, but give the methods of working, theoretical discussions, forms for systematizing experimental and theoretical work, and data of general usefulness in predetermining the magnitude of induction to be expected under given conditions and in prescribing remedial measures.

All these reports are on file at the offices of the railroad commission in San Francisco, but unless they are published, the valuable information they contain will not be generally accessible. Their publication, however, is contingent upon the receipt of a sufficient number of orders substantially to defray the cost of printing and binding. All persons who are interested in procuring a copy of this publication are requested to notify Richard Sachse, chief engineer of the Railroad Commission of California, at San Francisco, to this effect.

Conditions of proximity of power and communication lines that cause inductive interference are designated by the joint committee as "parallels." In preparing the final report, a large amount of study was given to the question of determining the conditions of length, separation, voltage, current, wave shape, balance, conductor arrangement, etc., that would constitute a "parallel."

In order to set forth the relations in reasonably simple form, it was necessary to assign definite values to several factors which in practice vary widely in value and which it is usually not feasible to determine in particular cases. It was found that sufficient information was not at hand to satisfy all parties as to the assumptions regarding these factors.

The committee feared that a definition of these relations, based on such assumptions, would be used in cases where the assumptions did not apply. Consequently, the report does not include such a definition. The record of work done on this complex problem remains, however, of great value, as indicating the general method of attacking the problem, the difficulties to be overcome, and the accomplishment of results up to date.

Basic Physical Principles of Rules.

The report gives the following as the seven "basic physical principles which underlie the rules recommended and which should guide all efforts to prevent inductive interference":

1. Avoidance of close proximity.
2. Elimination or suppression of harmonics.
3. Limitation of residuals.
4. Reduction of intensity of induction by favorable arrangement of conductors.
5. Neutralization of induction by coordinated transposition systems.
6. Balancing of metallic communication circuits.

A brief summary of the recommended rules follows:

The first section entitled, "General Provisions," provides for:

(a) Applicability of the rules. Rules on operation and maintenance are to apply throughout; rules for specific parallels, to cases hereafter created; rules not limited to lines involved in a parallel, to new construction, and in the event of reconstruction. (b) Co-operation. (c) Method of remedy involving the least total cost. (d) Existing parallels are to be cared for with due diligence, depending on the seriousness of their effects.

The second section consists wholly of definitions.

The third section entitled, "Location of Lines," requires:

(a) Avoidance of parallelism wherever practicable. (b) Advance notice of intention to construct a line which will create a parallel. (c) The distance between parallel lines to be made as great and as uniform as practicable. Where other remedies fail, the separation is to be increased. (d) and (e) Parallels shall be as short and as free from discontinuities as practicable. Unnecessary crossings of highways are to be avoided.

The fourth section entitled, "Design and Construction of Lines," requires:

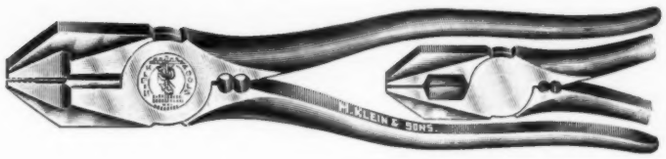
(a) Attention to quality and workmanship to prevent failures causing interference. (b) Consideration of the configuration of power circuits is required, also the avoidance of excessive spacing, long two-wire branches from three-phase lines, and single-wire grounded circuits. (c) Power circuits are to be transposed throughout their lengths with barrels of 6 to 12 miles, excepting lines under 12.5 k. v. with grounded neutrals and certain lines located on private rights-of-way. Existing power circuits are to be transposed outside parallels hereafter created when necessary for capacitance balance, with regard to discontinuities. (d) Inside parallels an adequate transposition scheme, consisting of co-ordinated transpositions in the power and communication lines, if the latter are metallic, is to be installed, determined by co-operative study. In general, at least one barrel shall be placed in the power circuit. At highway separations from telephone lines, three-mile barrels should ordinarily be employed. For parallels with telegraph lines, six-mile barrels are ordinarily sufficient. The most economical scheme and utilization of existing transpositions are to be considered.

The fifth section is entitled, "Design, Construction and Arrangement of Apparatus." It provides for:

(a) Quality and arrangement of apparatus to minimize interference. (b) Rotating machinery should have good wave form. Grounds on generators are to be avoided, unless the arrangements are such as to avoid unbalancing the circuit and introducing residuals. (c) Transformer exciting currents should be as low as is consistent with good practice (for most cases less than 10 per cent at normal voltage). Grounded single-phase, grounded three-wire two-phase, and grounded open-star three-phase connections are prohibited. Star-connected auto transformers with grounded neutrals on three-phase lines in parallels must also have low-impedance, delta-connected windings or other equivalent means of suppressing triple harmonic residuals. (d) Auxiliary devices to prevent distortion of the waves by rectifiers, etc., are to be installed where necessary. (e) One oil switch with poles mechanically interconnected for simultaneous operation is required between a parallel and the source of supply of the power line to operate automatically in case of abnormal conditions, except where an operator is on duty. Consideration is to be given to switching arrangements to minimize transients. Where air-break or single-pole oil switches cause trouble, oil switches with poles interconnected are to be used. (f) Fuses are to be avoided for main lines in parallels. (g) Electrolytic lightning arresters are to be equipped to minimize their disturbing effects. (h) Indicating devices are to be provided at supply stations to give warning of abnormal conditions, and ammeters are to be installed in important neutral-ground connections. (i) Apparatus for metallic communication circuits is to be well balanced

The sixth and last section is entitled, "Operation and Maintenance," and requires:

(a) All reasonable care by power and communication interests to minimize interference and, in particular, (b) Prevention of mechanical and electrical failures which would cause or promote transient disturbances and unbalanced loads. (c)



It's a "Klein!"

and that's all you need to know to be sure it's the best you can get.

However, as a reminder, we might mention that the genuine Klein Side-Cutting Plier is unquestionably the easiest cutting plier on the market.

Handles shaped to fit the hand.

Each pair accurately adjusted to assure perfect alignment of the knives. Every pair sold under positive guarantee.

Write for Catalog

MATHIAS KLEIN & SONS, Tool Mfrs.
Canal Station 34, Chicago

CONDENSERS

Mansbridge Type Condensers are Self-Sealing and cannot be internally short-circuited. If one is broken down by a lightning or high-tension discharge, or by mechanical damage, it automatically and instantaneously seals up, this being the unique and characteristic property of the metallized paper.

You can drive a pin right through a Mansbridge Condenser and the capacity and insulation will still be O. K.! Sounds impossible, but it's solid fact!

Complete Satisfaction

That's the reason why the Mansbridge Condenser has made good.

Mansbridge Condensers are **More Reliable, Lighter, Smaller and no more Costly** than those of the old fashioned solid foil type.

They are made under license by Western Electric Company, Ericsson Mfg. Co., Electric Specialty Co., Stromberg-Carlson Co., American Electric Co., and by numerous other licensees all over the world.

Insist upon having MANSBRIDGE CONDENSERS.

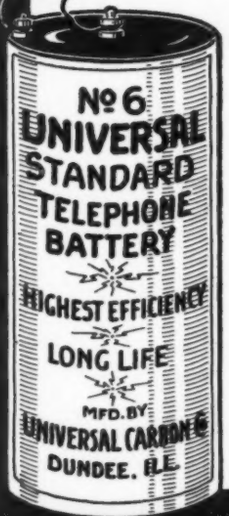
For full particulars and for terms of manufacturing license in U. S. A. and Canada apply:

G. F. MANSBRIDGE
Mount House, New Barnet, England

USE UNIVERSAL BATTERIES

ON YOUR TELEPHONES

and be assured of Reliable Service



Highest Efficiency
Greatest Recuperation
Long Life
Fully Guaranteed

WRITE FOR PRICES, ETC.

UNIVERSAL CARBON CO.
DUNDEE. ILLINOIS

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

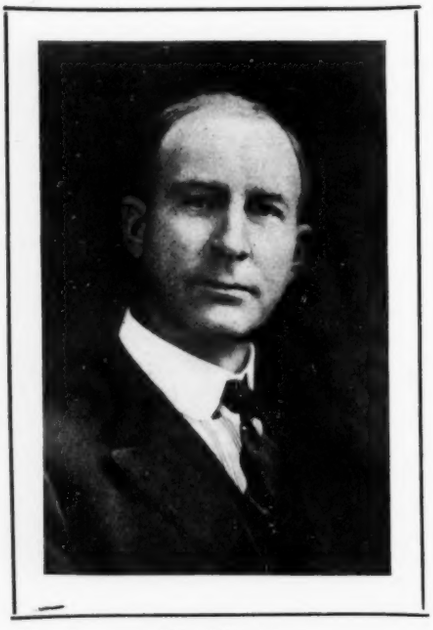
Daily record of current in grounded neutrals of important stations. (d) Transformers are not to be operated at more than specified percentages above normal voltage. (e) Care shall be exercised to avoid switching disturbances. (f) Where lightning arrester charging disturbs, it should be done in the early morning. (g) A definite procedure shall be provided for station operators during times of abnormal unbalance on power lines involved in parallels. In general, the section of a faulty line passing a parallel should be disconnected until cleared, and not energized more than once in locating the fault. To facilitate the study of such cases, accurate records are to be kept of occurrences under abnormal conditions.

The entire work of the Joint Committee on Inductive Interference constitutes a notable example of the efficiency of cooperative work of engineers representing conflicting interests in lieu of methods of litigation based upon meager information concerning the underlying principles and facts of a complex problem.

As perhaps the chief result of this effort on the part of the joint committee, there has been created in the state of California a realization of the seriousness of inductive interference, an understanding of practical preventive and remedial measures, and most important of all, a disposition on the part of the power and communication companies to co-operate in the solution of the problems which arise from the construction of the two classes of lines in proximity.

Biographical and Personal Notes

John Y. Rust, president of the San Angelo Telephone Co., which has its headquarters in San Angelo, Texas, migrated to the Lone Star state while still in his 'teens, from the East. Mr. Rust



John Y. Rust.

began his telephone experience, while a boy, with the Postal Telegraph-Cable Co., in Washington, D. C., and was for some time engaged in the construction department of that company. He was later connected with the same department of the Baltimore & Ohio Telegraph Co., during which time he played a part of some importance in the erection of many heavy and expensive lines between such cities as Washington, Baltimore, Harrisburgh, Pa., New York City, Boston and Buffalo.

Deciding to move Westward, he arrived in Waco, Texas, while a very young man, and immediately established a record for himself as a builder by constructing a telegraph line between Hico and Hamilton, Texas—which was quite a feat in those days.

Going still farther Westward, Mr. Rust settled in the thriving little Texas city of San Angelo, where he was joined, in 1898, by his two brothers, who had been in the employ of the American Bell Telephone Co. in Philadelphia. The Rust brothers set out to persuade the citizens of that particular part of Texas that they needed telephone service and especially that kind of telephone service furnished by the Rust brothers.

That they have been successful is shown by the record of the San Angelo Telephone Co., which today operates more than 1,000 miles of copper toll lines, and 18 successful Independent telephone exchanges in nine or ten counties of Western Texas.

John and Jerry Rust are famed among the Independent telephone men of Texas as two "square men," and they number their friends down the length and breadth of the largest state in the union.

Mr. Rust is an active and earnest worker in Independent telephone association affairs, and his wise counsel has been of great worth to the industry in Texas. He was president of the Local Owners' Telephone Association of Texas, which was recently consolidated with the Texas Independent Telephone Association.

When there is anything of importance doing in Independent telephony in Texas, John Rust has a hand in it—hard work and the overcoming of difficulties is a specialty of his. He is one of the most substantial citizens of San Angelo, and his word carries weight in the civic affairs of that city. John Rust is a valuable asset to Independent telephony in Texas.

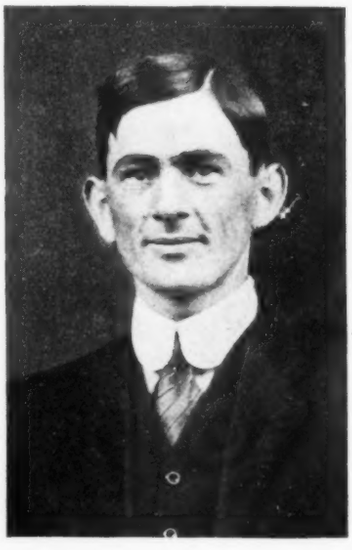
Ernest L. Sproul, who has been associated with the Dundee Telephone & Telegraph Co., of Dundee, N. Y., for the past 12 years, has been made manager of the Dundee exchange, succeeding S. A. Price, deceased.

Captain Bernard C. Groh of the United States Signal Reserve Corps was a visitor at TELEPHONY's offices this week. Mr. Groh has just been transferred from the officers training camp at Fort Leavenworth, Kan., to Little Silver, N. J.

William S. Stitt, secretary of the Home Telephone & Telegraph Co. of Fort Wayne, Ind., is confined to his home, suffering from the effects of a paralytic stroke which occurred recently. His entire left side is paralyzed and physicians are of the opinion his recovery is doubtful.

J. Cager Head, manager of the Lawrenceburg Home Telephone Exchange, Lawrenceburg, Ky., is a native of the Blue Grass state. He was born in Bradfordsville, Marion county, February 16, 1890, and received his education in the graded schools of that town.

Nearly ten years ago he entered the employ of the Lebanon Home Telephone Co., at Bradfordsville, Ky., as extra man. In February, 1913, he was made troubleman at Lebanon, resigning in October to assume charge of the Paris Home Telephone & Telegraph Co.'s exchange at Millersburg, Ky. After spending nearly two years at Millersburg, he was transferred to Owenton, Ky., as manager for the Owenton Telephone Co., in June, 1915.



J. Cager Head.

In the fall of last year he was promoted to his present position, that of manager for the Lawrenceburg Home Telephone Co.

Before entering the telephone field, Mr.

JOHNS-MANVILLE FIBRE CONDUIT

CAN BE LAID IN SHALLOW TRENCHES

WHERE the grade changes abruptly, Johns-Manville Fibre Conduit saves trench troubles. By using standard elbows and bends, Johns-Manville Fibre Conduit can be laid in shallow trenches to conform with the surface grade; this permits a saving in trench excavation and reduces the number of manholes to a minimum.

This is an obvious advantage over other types of conduit where severe grade changes make it necessary to excavate deep, straight trenches.

The high compressive strength of Johns-Manville Fibre Conduit prevents buckling under heavy loads, sudden shocks or surface stresses. When properly laid and encased in concrete, it forms permanent structure and provides a perfectly smooth continuous duct in which cables can be installed, or removed from, without damage.

Johns-Manville Fibre Conduit is light, easily and cheaply handled, breakage losses are negligible, it is easy to rod or "fish", owing to the smooth bore and burrless joint. Johns-Manville Fibre Conduit meets every requirement.

JOHNS-MANVILLE SERVICE COVERS THE CONTINENT

Saves Money, Worry and Cable. Let us quote you?

H. W. JOHNS-MANVILLE COMPANY
NEW YORK CITY
10 Factories—Branches in 60 Large Cities

OUR EXTRA HEAVY DOUBLE GALVANIZED WIRE INSURES
HIGHEST EFFICIENCY.
LONGEST LIFE.
LOWEST COST OF UPKEEP.

It's easy to determine, TEST IT.

As wire will test best, so also will it last best and give better satisfaction while it lasts.

We guarantee our wire to conform with all standard specifications as well as to be satisfactory to the purchaser.

IT'S THE ONE BEST PROVEN BY TEST.—*TRY IT.*

Handled by most representation jobbers and supply houses.

Write for samples, test and compare.

INDIANA STEEL & WIRE COMPANY
MUNCIE INDIANA U. S. A.

OshKosh "The Service Quality Tools"

Did you read the series of letters from prominent jobbers and electrical supply dealers which we recently published in Telephony? Were you not impressed by the high indorsements which these people gave OSHKOSH TOOLS? The judgment of the trade is based on years of experience which gives them a very definite knowledge of the quality of service which OSHKOSH TOOLS have rendered their customers.

Before ordering your tools for 1918 investigate the OSHKOSH line. Write today for our catalog—also the name of your nearest jobber.

Oshkosh Mfg. Co.
OSHKOSH, WIS.

Head spent some time in farming and was also employed as a salesman in general stores. Next to the telephone game, he is very much interested in all kinds of athletic sports and always makes a good record.

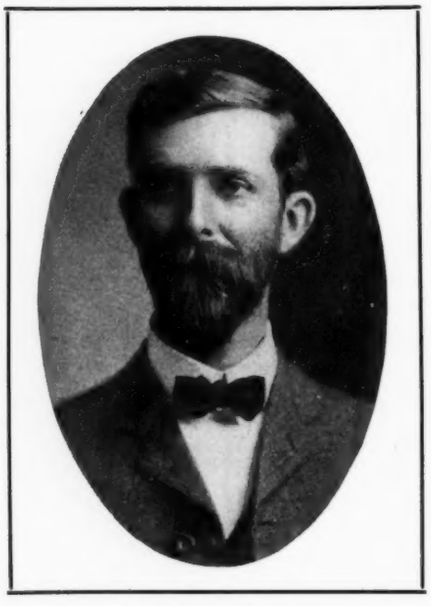
Mr. Head's motto is "Do It Now," and he lives up to that slogan, as his associates in the Central Home organization will testify. He has many friends, as he is the kind of man who has a good word for every one, and tries to obtain the good will of those with whom he comes in contact. He is another of those bright, active, ambitious, hard-working, dependable men, typical of the spirit of the personnel of the Central Home's efficient organization.

Lucius F. Clark, vice-president of the Minnesota Independent Telephone Association and president and manager of the Bellingham (Minn.) Telephone Co., was born in Cavendish, Vt., May 13, 1864, and acquired his education at the Leland & Gray Seminary, Townshend, Vt.

He was founder of the Bellingham Telephone Co., which he organized in 1904 and of which he is now president and manager. His first association activity was in helping to organize the Seventh Congressional District Independent Telephone Association, of which he was secretary. After two annual meetings this association was merged into the Minnesota state association, with two other similar district organizations.

Mr. Clark was the first president of the Minnesota Independent Telephone Association and served for five consecutive terms. During that period he gave a considerable portion of several months each year in active work for the association before legislative committees, in conducting a general publicity campaign through newspapers, circulars, pamphlets and the M. I. T. A. Message, the official organ published by the state association.

That this campaign largely influenced the passage of the present telephone law is beyond question. The law is not up to his ideals, but embodies so many of the things urged in the years of struggle for



Lucius F. Clark.

legislative action that he feels a keen personal satisfaction in the result.

"Energetic" is a term which may well be applied to Mr. Clark, for he is a man of great activity. He is of an investigative nature, capable of concentrating deeply upon a problem and ascertaining all the facts and arranging them in a methodical manner. Inclined to be friendly and social, Mr. Clark has no difficulty in making friends.

Since retiring as president of the state organization, Mr. Clark has held the office of vice-president.

Mr. Clark is president of the Bellingham State Bank, of which he has had active charge for nearly 25 years. He is dean of Lac qui Parle county bankers as to years of service.

J. A. Ainsworth, for the past year connected with the commercial department of the Indianapolis Telephone Co., Indianapolis, Ind., has joined the commercial department of the Tri-State Telephone & Telegraph Co., at St. Paul, Minnesota.

Obituary.

William A. Geiger, formerly part owner of the Churubusco Telephone Co., died recently at his home at Churubusco, Ind., as a result of an attack of paralysis. He had been in ill health for several years.

Silas A. Price, president and general manager of the Dundee Telephone & Telegraph Co., Dundee, N. Y., passed away in Rochester on December 11, at the age of 71. He had served the telephone company in this capacity since July 1, 1906, and as manager since its organization in June, 1903.

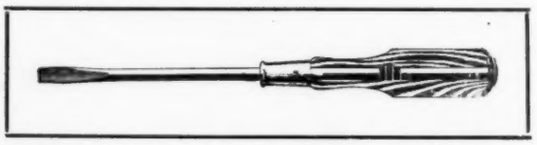
Mr. Price learned telegraphy some 44 years ago and since that time had been very much interested in all manner of communication by wire, with both telephone and telegraph instruments, until 1903, when he retired from the drug business and gave his entire time to the management of the Dundee Telephone & Telegraph Co. Prior to organizing the Dundee company in 1903, Mr. Price built, at his own expense, the first telephone line in Yates county. The line extended from Wayne, through Crystal Springs, to Dundee.

From Factory and Salesroom

Conventions: Western Pennsylvania, Pittsburgh, January 18-19; Minnesota, Minneapolis, January 22-24

A Useful Addition to the Telephone Lineman's Tool Kit.

The Insulectric screw driver, a sectional view of which is reproduced below, will undoubtedly prove to be a very useful and



Sectional View of the Insulectric Screw Driver.

valuable addition to the tool kit of the telephone lineman or construction man.

A distinguishing feature of this screw driver is the insulation of hard fiber in the handle of the tool, making it shockproof under all conditions (with a breaking point of 10,000 volts) and serving as part of what is, in effect, a continuous shaft with a heavy rivet head.

The blade of the screw driver is of high grade, finely tempered steel and the hantile is of carefully seasoned New England hickory. The form of the handle has been carefully planned to combine grace of design with practicability. The grip is said to be the firmest any any screw driver made and the tool when carelessly laid down on a table will not roll off.

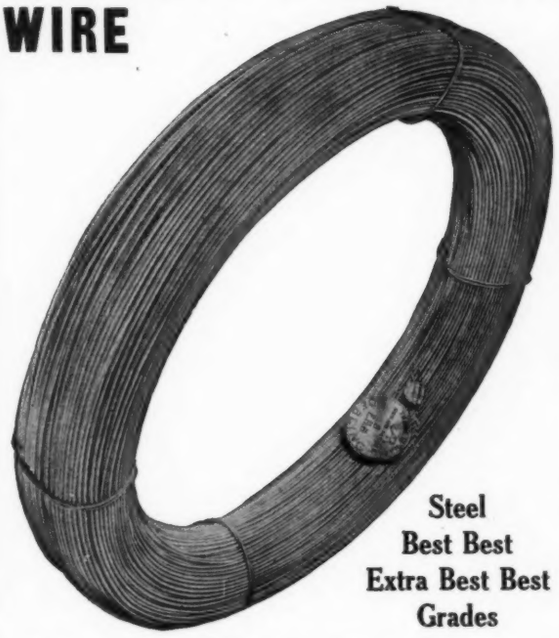
The rigid construction of the tool, combined with the high quality of materials, insures a screw driver which, it is contended, will withstand the severest usage. Insulectric screw drivers are made with blades from two to twelve inches in length and with fluted or unfluted handles. Further information will be promptly furnished by its manufacturer, the M. B. Tool Co., of Danielson, Conn.

National Carbon Co.

This week's issue contains an advertisement of the National Carbon Co., whose announcements have been absent from our pages for several years. The resumption of this advertising marks a clearing up of a misunderstanding which dates back to 1910.

Investigation shows that statements that the National Carbon Co. has an entangling alliance with the Western Elec-

ROEBLING TELEPHONE WIRE



Steel
Best Best
Extra Best Best
Grades

John A. Roebling's Sons Company
TRENTON, N. J.

BRANCHES:
New York Boston Chicago Philadelphia Pittsburgh Cleveland
Atlanta San Francisco Los Angeles Seattle Portland, Ore.

THE NEW PLANT "MAN"
(reproduced by courtesy Southern Telephone News)
Makes work easy when she uses
KESTER ROSIN-CORE WIRE SOLDER
CHICAGO SOLDER COMPANY
CHICAGO, ILL., U.S.A.

TELEPHONE ENGINEERING

¶ The "A B C of the Telephone" is a book valuable to all persons interested in this ever-increasing industry. No expense has been spared by the publishers, or pains by the author, in making this the most comprehensive handbook ever brought out relating to the telephone.

¶ The volume contains 375 pages, 268 illustrations and diagrams; it is handsomely bound in black vellum cloth, and is a generously good book without reference to cost or price.

Price, One Dollar Postpaid

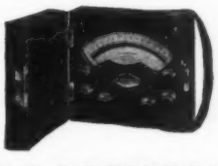
Send all Orders to
Telephony Publishing Co.
344-351 Monadnock Bldg., Chicago

Trouble Detectives!

PIGNOLET Portable Testing Meters will locate any kind of trouble besides measuring volts and amperes; will also determine resistance of coils, lines, ringers, etc.

VOLTMETERS
AMMETERS
VOLT-AMMETERS

Suppose you let us send you a copy of the PIGNOLET Catalogue. It's worth while.



L. M. PIGNOLET
80 Cortlandt Street New York
Medal Panama-Pacific International Exposition

tric Co. are unfounded. It is not unnatural for any corporation—large or small—to desire to be freed from the imputation of being tied to the Bell factory, and it is, therefore, gratifying to record that the National Carbon Co. has no connection with the Western Electric Co. Officers of the National Carbon Co. so allege, and the facts justify the allegation.

The further explanation is due to be made that the reason the National Carbon advertising ceased in TELEPHONY in 1910 was on account of failure to fulfill a contract on the part of the former management of this journal at that time. TELEPHONY believes in a square deal for everybody, is glad to correct an error, and to list the National Carbon Co. among its advertisers seeking Independent telephone patronage.

Stromberg-Carlson Equipment for Owensboro, Ky.

The Owensboro Home Telephone & Telegraph Co. has placed an order with the Stromberg-Carlson Telephone Mfg. Co. for a complete centrally-operated central energy exchange equipment for its plant at Owensboro, Ky.

The new main switchboard will be arranged for an ultimate capacity of 4,200 lines and will be equipped for present operation with 1,400 central energy local line equipments, 30 toll line equipments and 40 rural line equipments. The cord circuits will be of the most modern type, including the following automatic features: Automatic harmonic party-line ringing; flashing recall, automatic operator's cut-in and cut-off; automatic busy test and automatic peg count.

The installation will also include a full complement of terminal and distributing frames, storage battery plant, power board charging and ringing machines, chief operator's and wire chief's desks, etc.

Additional Automatic Equipment Ordered for Los Angeles.

An order for 600 lines of additional automatic central office equipment has just been placed with the Automatic Electric Co., of Chicago, by the Southern California Telephone & Telegraph Co. This organization is the successor of the Home Telephone & Telegraph Co., which, for more than a dozen years, operated the automatic system in Los Angeles.

Beginning in 1904, the Home company made an initial installation of 6,700 lines. The service rendered by this equipment proved so satisfactory that constant additions have since been made, partly to displace the previous manual apparatus and partly to keep pace with the extraordinary growth of the system, which now serves 65,000 instruments.

This is the second recent order for additional equipment, a thousand lines being ordered earlier this year.

Chas. Proner Now With the Wales Advertising Co.

Chas. Proner, formerly advertising manager of the Smith & Hemenway Co., of New York City, recently severed his connections with that company to become associated with the Wales Advertising Co. of that city, but with which firm he will still handle Smith & Hemenway publicity.

Mr. Proner is a practical and experienced advertising man, and his many telephone friends will be pleased to learn of his advancement.

Chas. Proner.

Successful Year Concluded by Reliable Electric Co., of Chicago.

Success comes to those who aspire. So it was natural that the Reliable Electric Co., of Chicago, should succeed and expand, because it was determined from the outset to build the permanency of its business upon the satisfaction of its customers. And, satisfaction is the natural consequence of good service rendered, and of an article used which "stood up."

This policy has paid Reliable Electric Co. very well, as it has passed several very interesting milestones. The year just concluded was easily the largest in its history and yet previous years showed a substantial volume.

One reason, however, why the Reliable Electric Co. is growing is its well-founded policy of giving the buyer what he requires. When it is found that something which is offered for use or adoption is not quite so efficacious as something which might instead be developed for the express purpose, the Reliable Electric Co. has been very prompt to give the operating telephone man what he needs.

This evidence of willingness to cater to the various requirements of telephone service has gradually increased the number and kind of its products until now it is claimed Reliable telephone switchboard and cable protective specialties are so numerous and diversified that there is a specialty for every sort of telephone work where good protection is essential.

The rapid development of its sub-station protective business was thus inevitable. At present it makes and sells 49 different and distinct types of sub-station protectors, a protector for every condition; a protector at almost any price; a protector, in other words, which is sure to please. For completeness of style, and simplicity of design, it would be difficult, it is said, to excel the Reliable line.

Of especial mention it deserves to be said that none of the Reliable specialties is complicated. Simplicity is the dominant feature. Excessive maintenance expense has thus been eliminated.

Does this policy pay? Is it worth while to cater to the wants of the average telephone company? Do telephone men generally appreciate individual service and attention? The Reliable Electric Co. attributes the growth of its business to giving its subscribers what they require.

The Reliable Electric Co. is a firm exponent of preparedness. It thoroughly believes in the economic policy of getting ready for what may come, rather than waiting until it does come and then be unprepared.

The new year will find the Reliable Electric Co. prepared and ready to take care of a larger volume of business. This same policy made the year just closed very gratifying, and during the entire year it is said there was no instance of a telephone customer displeased because of its service.

The Reliable Electric Co., through its principal officers, W. L. Cook, president and treasurer, and Geo. W. Rodormer, secretary and sales manager, desires to take this opportunity to thank the trade at large for making 1917 its most successful year, and hopes that this year will enable it to enjoy the patronage of many other telephone companies, small as well as large.

Paragraphs.

GEORGE A. BRIGGS, vice-president and general manager of the Chicago Telephone Supply Co., of Elkhart, Ind., has been appointed federal food administrator for the city of Elkhart.

E. W. ROTH, formerly manager of the pole yard and treating plant of the Lindsley Brothers Co., at Minneapolis, Minn., who was assigned to Battery A, 337th Field Artillery of the national army, at Camp Dodge, Iowa, has been promoted to ordnance sergeant, senior grade, of the regiment. He has also been recommended to the third officers' training camp.